FOOD ENGINEERING

December 1951

A McGRAW-HILL PUBLICATION • FORMERLY FOOD INDUSTRIES

35 CENTS

Butter is cut, wrapped, and cartoned in less than 3 min. at advanced Land O' Lakes packaging plant. (Page 80)

In This Issue:

How to Pick Good Workers	69	Top Quality in Potato Chips	94
Inert Gas Guards Quality	72	Pie-Stock Apple Cost Study	97
34 Tips on Better Packaging	76	Pacemaking Steam Peeling	106
Efficiency-Plus on Candy Line	82	Packer Speeds Brine Makeup	108
Latest Equipment for Bottlers	86	Making Better Concrete Floors	112
Brewery Program Ups Profits	88	Open Pressure-Cooking Tested	143
New Roquefort Flavors	93	Yeast Technic Improves Wines	145

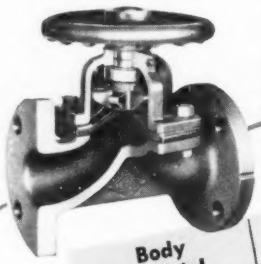
NEW PACKAGES AND PRODUCTS

. . . Revealing the Latest In Foods and Containers

Pages 160-165

WHAT WOULD **YOU** SPECIFY . . .

Fluid	Concentration	Temp.	Type of Valve	Valve Material
1 Sulphiric Acid	20%	120 F.		
2 Sulphuric Acid	100%	180 F.		
3 Hydrochloric Acid	32%	80 F.		
4 Hydrofluoric Acid	50%	125 F.		
5 Beer		200 F.		
6 Oxygen		Ambient		



We supplied Grinnell-Saunders Diaphragm Valves with . . .

Body Material	Diaphragm Material
1 Rubber lined	Natural rubber
2 Cast iron	KEL-F
3 Glass lined	Butyl
4 Magnesium	KEL-F
5 Polished bronze	White diaphragm
6 Cast iron*	Neoprene

*For oxygen service a high flash point lubricant is supplied. All valves for oxygen service are subjected to 300 lb. air underwater test.

In several of these cases other body materials or diaphragms would serve as well. But the really important fact is the unmatched versatility of Grinnell-Saunders Diaphragm Valves in handling corrosive fluids, gases, compressed air, food and suspended solids . . . in lines where corrosion, abrasion, contamination, clogging, leakage and maintenance are problems.

Grinnell-Saunders Valve bodies are stocked in cast iron, malleable iron, stainless steel, bronze, and aluminum, with other materials available on special order. Valve bodies can be lined with lead, glass, natural rubber or neoprene. Diaphragms are available of natural rubber and a number of synthetics to suit particular service conditions.

The Grinnell-Saunders Valve Division will be pleased to submit recommendations upon receipt of complete information covering service conditions.

Features of the Grinnell-Saunders Diaphragm Valve

- diaphragm absolutely isolates working parts from fluid
- diaphragm lifts high for streamlined flow in either direction
- diaphragm presses tight for positive closure
- body, lining and diaphragm materials to suit service
- simple maintenance—diaphragm easily replaced

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Food Engineering

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FEATURE ARTICLES

		Baking	Beverages	Cereals	Confectionery	Dairy	Fruits, Vegetables	Meats, Fish	Other Foods
Short Cuts in Picking Ace Workers	69	•	•	•	•	•	•	•	•
Moving Them by the Millions	71	•	•	•	•	•	•	•	•
Inert Gas: Safeguard of Quality	72		•			•	•	•	•
Getting More From Your Packaging Line	76	•	•	•	•	•	•	•	•
Speedier Butter Packaging	80					•			•
Kroger Teams Management, Methods, Equipment for Better Than Machine-Made Efficiency	82				•				
Latest Units Viewed by Bottlers	86		•						
Three P's To Profits	88		•						
New Roquefort-Type Flavors	93					•			•
They Engineered Farm-to-Family Quality	94					•	•		•
Costs and Methods for Pie-Stock Apples (Report)	97	•					•		
Quality Peeling Sets a New Pace	106						•		
How Easy-to-Use Tank Markers Solve Brine Makeup Problem	108					•	•	•	•
Top-Service Concrete Floors	112	•	•	•	•	•	•	•	•
Making Quality Potato Chips (Foldout)	134						•		•
Rigs Postage-Meter as Labeler and Cut Costs	141	•	•	•	•	•	•	•	•
Lab Tests Show Possibilities of Open Pressure-Cooker	143					•	•	•	•
Uniform Quality Wine	145		•						
Cargo Heater Gives Safe Warmth	149		•		•	•	•	•	•

NEW EQUIPMENT AND SUPPLIES

Integrated Control System Is Accurate	115	•	•	•	•	•	•	•	•
Telescopic Loader Minimizes Labor	115	•	•	•	•	•	•	•	•
Automatically Cleans, Sterilizes Food Lugs	116	•			•	•	•	•	•
Tractor Device Automatically Engages Trailer	116	•	•	•	•	•	•	•	•
Pea Combine Speeds Operations, Saves Man-Hours	117						•		
Conveyor Has Fast-Change Sections	117	•	•	•	•	•	•	•	•
Unit Puts Spot-Registered Imprints on Cartons	119	•	•	•	•	•	•	•	•
Pilot Plant Pulverizer Is Simply Installed	119	•		•	•				•
Rubber Frame Goggles Are Gas-Tight	121			•					•
Truck Gas-Refrigerator Has Electric Plug-In	121		•		•	•	•	•	•
Case Sealer Avoids Carton-Jamming	121	•	•	•	•	•	•	•	•
New Roller Curve Provides Improved Handling	121	•	•	•	•	•	•		
Lift Truck Maintenance, Handling Simplified	123	•	•	•	•	•	•	•	•
Hand Truck Features "No-Bind" Nose Unit	123	•	•	•	•	•	•	•	•
Does Fast, Thorough Job In Scrubbing Floors	123	•	•	•	•	•	•	•	•
Hollow Flight Unit Has High Heat Transfer Rate	125		•	•		•	•		•
Yeast-Mix Cabinet Cuts Labor, Ups Quality	125	•							
Compact Battery-Charger Can be Mounted on Shelf	127	•	•	•	•	•	•	•	•
Motor Resists Dirt, Grit, Moisture	127	•	•	•	•	•	•	•	•
Checks Material Levels in Large Size Bins	127	•	•	•					•
New Stacker Needs Less Aisle Space	129	•	•	•	•	•	•	•	•
Valve Used Two Ways—Sampling, Venting	129	•	•	•	•	•	•	•	•
Rubber Swinging Door Is Light, Flexible	129	•	•	•	•	•	•	•	•
New Liquid Germicide Cleans and Deodorizes	131	•	•	•	•	•	•	•	•
System Provides Chlorine for Water Treatment	131	•	•	•	•	•	•	•	•
Non-Melting Grease Used in "Hot-Spots"	131	•	•	•	•	•	•	•	•
Floor Life Extended With Use of Emery	131	•	•	•	•	•	•	•	•

PRACTICAL IDEAS

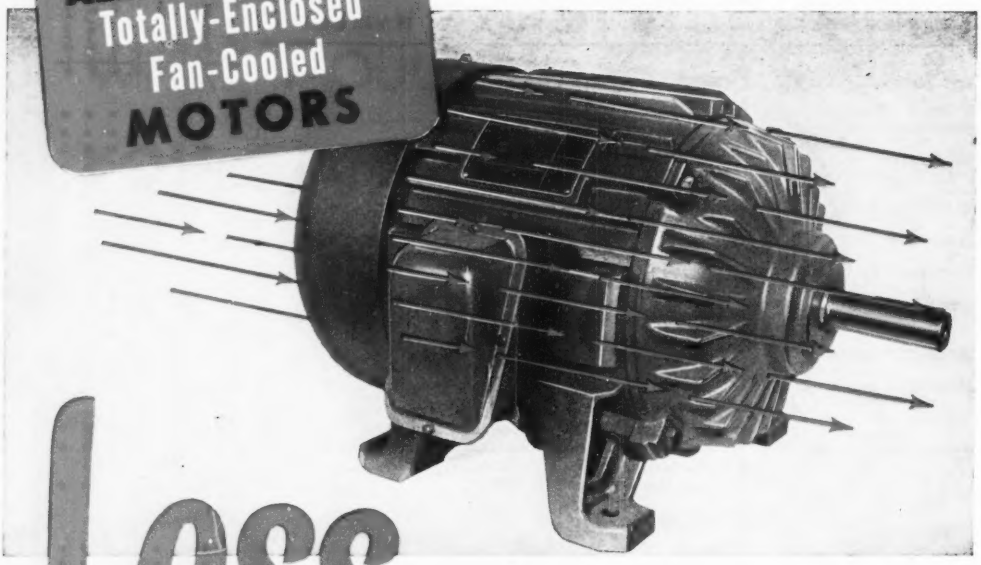
Cooling Rate Up—Floor Space Down	5						•		
How to Overcome Starting Torque	5	•	•	•	•	•	•	•	•
Safety Control on Roof Blowers	7	•	•	•	•	•	•	•	•
Dairy Delivery Boxes Improved	7					•			
Emptying Cans and Drums Made Easy	7	•	•	•	•	•	•	•	•
Conveyor Screens As It Transports	9	•		•			•	•	•
Workers Play Part in Safety Program	9	•	•	•	•	•	•	•	•
Keeps Product Temperature Uniform in Valves	9	•			•	•		•	
Accurate Shop-Made Volume Filler	11	•		•	•		•	•	•
Easy-to-Build Rack Clears Passageway	11		•				•		•
Folding Tables Extend Conveyor Use	13	•		•	•	•	•	•	•
Glass Wool Ends Infestation	13	•		•	○				•

OTHER DEPARTMENTS

In Behalf of Progress	132	**Schedule of Events**	196	•	•	•	•	•	•	•	•
New Packages & Products	160	**Men & Companies**	202	•	•	•	•	•	•	•	•
Advances in Technology	167	**Recent Inventions**	209	•	•	•	•	•	•	•	•
Questions & Answers	180	**Just Off the Press**	211	•	•	•	•	•	•	•	•
Useful New Books	182	**Advertisers Index**	222	•	•	•	•	•	•	•	•
Keeping Up With Field	185	**Free Reader Service Opp.**	224	•	•	•	•	•	•	•	•

INDUSTRY INDEX

ALLIS-CHALMERS
Totally-Enclosed
Fan-Cooled
MOTORS



Less MOTOR CLEANING ...INSPECTION...OVERHAUL!

HERE'S A MOTOR that actually blows itself clean! Dirt is carried away by cooling air blown over the ribbed cast iron frame and bearing housings of this new Allis-Chalmers tefc motor.

Dirt can't build up to cause overheating. Concealed air passages and pockets have been eliminated. Even oily dirt that sticks can simply be wiped or blown off.

And this means savings! Maintenance costs are traditionally low on totally-enclosed, fan-cooled motors. But they're lower than ever before on the new Allis-Chalmers Type APZ tefc motor.

Rigid Construction

The frame is cast iron which has high resistance against corrosion and distortion. Bearings are pre-lubricated at the factory and should need no attention for years. Tapped holes with pipe plugs to permit regreasing and to provide grease relief are standard equipment.

Get All The Facts

The new Allis-Chalmers Type APZ totally-enclosed, fan-cooled motor is built in all NEMA standard frame sizes from 224* to 505. Also in explosion-proof type. Your A-C Authorized Distributor or District Office has complete information. Call today, or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 51B7225.

A-3426

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CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

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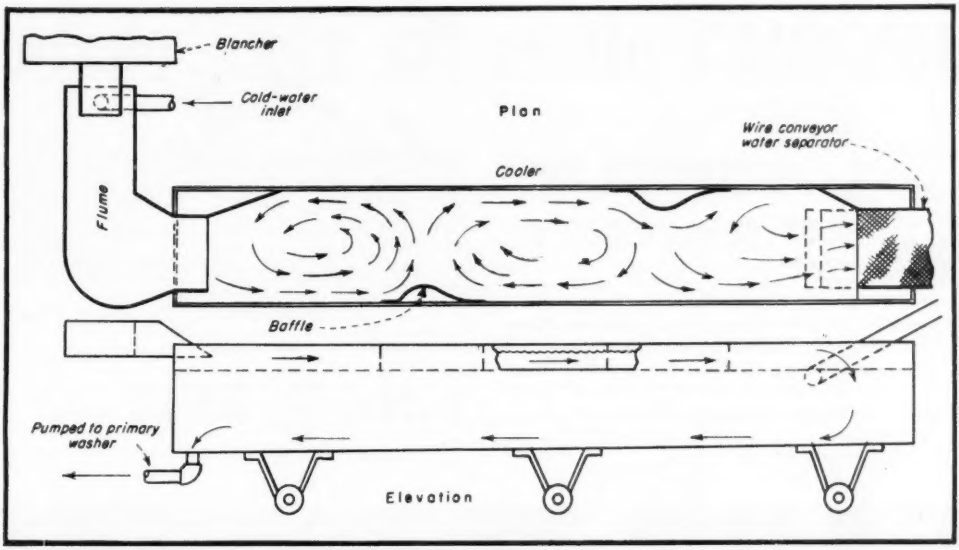
PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

Texrope and Vari-Pitch are Allis-Chalmers trademarks.

ALLIS-CHALMERS

*Similar design non-ventilated motors Type APK, also available in frames 203 to 224 inclusive.

PRACTICAL IDEAS



Cooling Rate Up—Floor Space Down

By adding a few sheet-metal baffles to a wide, shallow, flume-type trough, our Shoreland Freezers plant has increased the efficiency in cooling asparagus immediately after blanching.

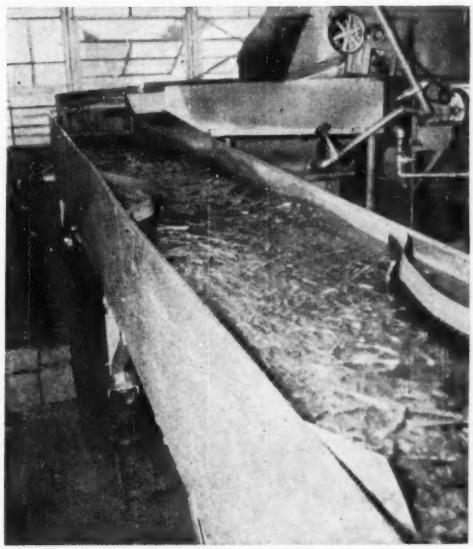
Thereby, the usual cooling rate is accelerated without an increase in equipment size or floor-space requirements.

Asparagus drops directly from blancher into a whirlpool tank, cooled by 58 deg. F. deep-well water, which was first pumped through tube-shell condensers. Cooler water exit temperature (65-68 deg. F.) is cold enough to use as wash water at the start of production.

Baffles in the shallow trough (see photo and drawing) cause the water to eddy several times during its travel the length of the trough. By adjusting the shape and location of the metal strips, a variety of products can be cooled.

Eddying has two advantages. Turbulence resulting increases the effect of the contact of the cooling water with the hot asparagus. Also, eddying extends the time of contact with the coolant because the asparagus circulates with the eddies. To accomplish the same result with uninterrupted flume flow would require a much longer trough.

Mounted on casters, the asparagus cooler is portable and can therefore serve on other lines to process a variety of products.—*Jack D. Braughler, Plant Superintendent, Shoreland Freezers, Inc., Salisbury, Md.*



How to Overcome Starting Torque

When equipment, such as heavy conveyors, mixers and beaters are driven by speed changers, starting torque can injure the equipment or motors—the least consequential results, being many blown fuses. Particularly is this the case with certain belt-drive speed changers constructed to prevent belt slippage.

On all such power transmission equipment, shear pins can be installed. Replacing these, when sheared by starting torque, is as much nuisance as replacing blown fuses.

There is an easier way. If the faces of the sheaves are roughened to the right degree, the belt will slip when the starting load is excessive. Heat generated by friction, tightens the belt on the sheaves. A clutch action results.

Sheaves can be roughened by taking a fine cut on a lathe. It is usually necessary to experiment with degrees of roughness until satisfactory results are obtained. But, this experimenting is preferable to risking damage to equipment or periodic stoppages from blown fuses.—*FE Staff.*

No ONE chain serves every purpose

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. . . engineered for your requirements

Don't settle for a "cure-all" chain to handle every job. Different types of chain have different characteristics. That's why Link-Belt makes the most complete line of chains in the world. Our engineers can recommend the exact type of chain to fit your particular needs . . . the one that does your job best.

Equally important is your assurance that *any* chain with the Link-Belt name will give you longer chain life. Exact control of raw materials and processes . . . plus manufacturing refinements add up to the highest standards.

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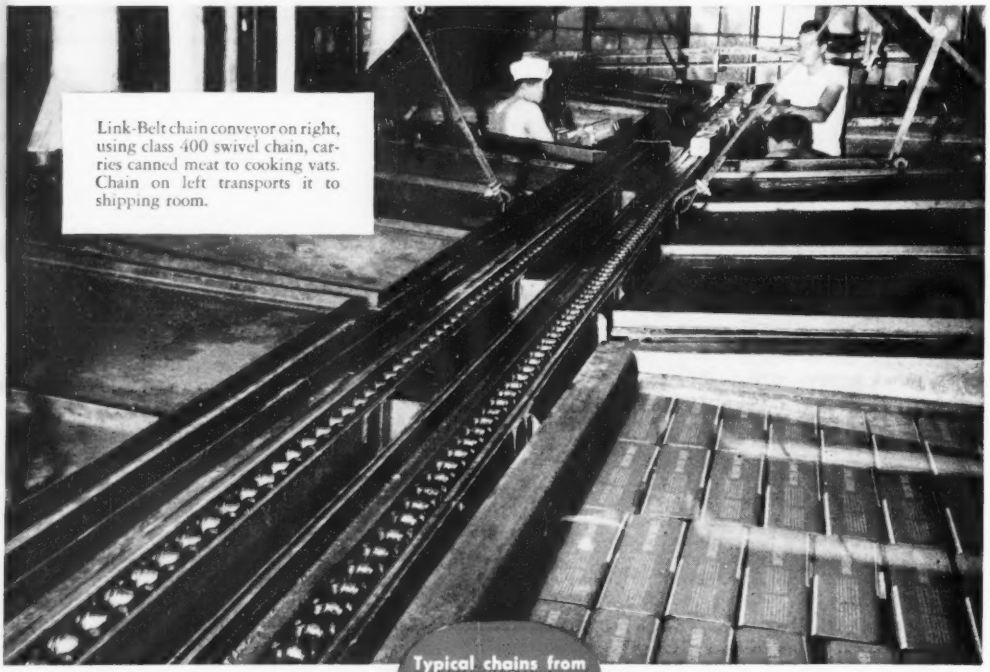
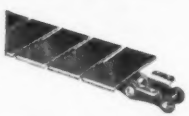
LINK-BELT

CHAINS AND SPROCKETS



Link-Belt chain conveyor on right, using class 400 swivel chain, carries canned meat to cooking vats. Chain on left transports it to shipping room.

Typical chains from the complete LINK-BELT line

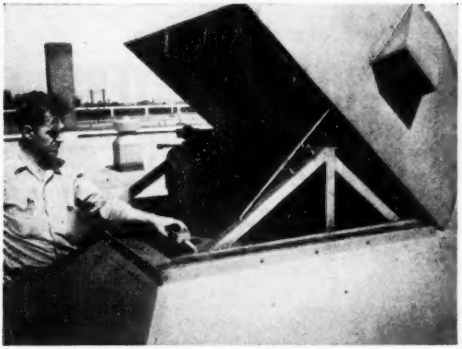


Class RC flat top chain — precision made for smoothest, spill-free carrying and long life.

Class RC crescent flat top chain—travels in horizontal planes, around corners; ideal for bottles and cans.

Class RC universal crescent flat top chain — travels in multiple planes, so one conveyor can replace several.

S-815 flat top conveyor chain—economical, sturdy, reliable, easy to detach and to keep clean.



Safety Control on Roof Blowers

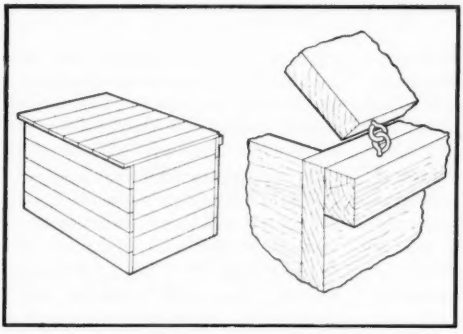
By installing an at-the-motor master-control on exhaust fans located on the roof of our processing plant we have materially reduced the chances of accidents to those doing maintenance or repairs on the fans.

One battery of ventilating fans draws moisture-laden air from cooking kettles and another group provides ventilation for other sections of the plant. Pushbutton controls for each fan are installed convenient to the location of the exhaust application. As fans are needed, these buttons are operated.

Formerly, when maintenance or repairs were necessary, repairmen turned off the motor of any fan to be worked on before climbing to the roof. However, while fans were being repaired, operators unaware of the work on the roof sometimes started them, hence chances of accidents were great.

Now, each one of the 20-odd roof blowers has a master pushbutton control (photo) installed near the motor.

When repairmen throw a switch, the fan motor cannot be started by the control in the processing rooms. Thus, a serious accident hazard has been removed.—*D. B. Bradshaw, A. H. Johnson Co., Boston, Mass.*



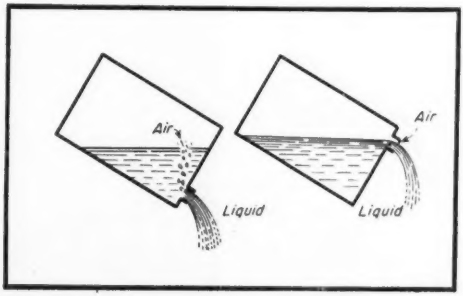
Dairy Delivery Boxes Improved

Those dairies now using, or planning to use, door-step containers to protect early hour, home deliveries of dairy products, will find that box design suggestions as developed by Midland Dairy Co., Midland, Mich., will save deliverymen's time, reduce construction costs, and extend the life of the boxes.

Route-man's time is conserved if the lid of the box (left sketch) is extended an inch or so over the edge, so that the man on the route, with hands full of bottles and carriers, need not stoop to lift the lid. Using his foot, the driver can raise and lower the projecting cover quickly and with little effort. Box cover is made of laminated plywood, body of ½ in. white pine.

Also, hinges, made of screw-eyes (right sketch) have advantages over conventional hinges. They never stick, and rusting does not put them out of action. Neither does ice in freezing weather. Good screw-eyes will last as long as the boxes and cost much less than conventional hinges.

Door-step boxes, usually unprotected from rain and snow, take a severe beating. Often located on the ground, box bottoms soon rot or fall prey to termites. Dip-treating boxes with "penta" preservative (chlorophenol), not only prevents the inroads of rot and termites, but also improves box appearance with an attractive paint-like finish.—*From "The Wood Saver", House Organ of Dow Chemical Co., Midland, Mich.*



Emptying Cans and Drums Made Easy

Pouring liquids from containers with off-center openings can be difficult. If the container content is corrosive, emptying may be dangerous.

When liquid is drawn from a container with the open-

$50 EXTRA FOR BEST ITEM

You are invited to submit Practical Ideas. You will be paid at regular rates when your item is printed and if it is judged best for the month you will get an additional payment of $50.

Selection of the best contributed item will be made by a group of 200 readers each month, and the item title and author's name will be cited (see below).

Practical Ideas may describe any type of device or method recently developed to solve a problem, speed an operation, or make some task easier. They may concern factory, laboratory, warehouse, or power-plant operations in the food industry. Ideas on management, maintenance, and trucking or shipping also are suitable.

You need not be an experienced writer or draftsman to submit these ideas. The text will be edited and sketches converted to finished drawings.

Send your items to: Practical Ideas Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

OCTOBER PRACTICAL IDEA voted best was "Aisle Game Areas Up Worker Morale", submitted by Edward N. Evans, Cambridge Wire Cloth Co., Cambridge, Md. It pointed out how plant passageways painted for shuffleboard games proved a big attraction to employees, engendered morale-raising competition, and stimulated plant cleanliness.

See Louisville for
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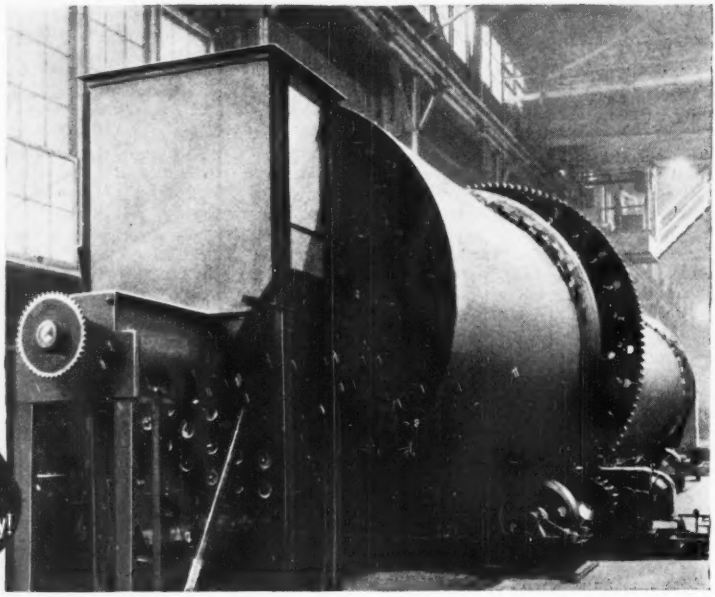

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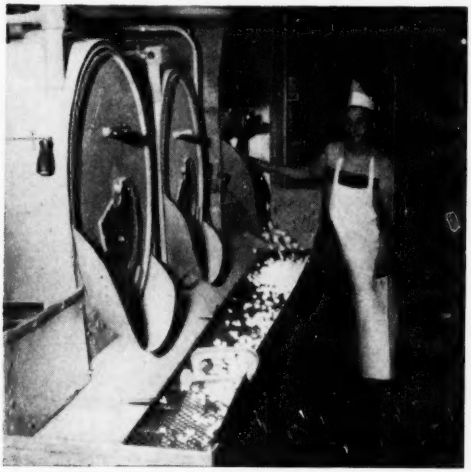
ing at the bottom, air which must replace the liquid will pass up through the liquid remaining in the drum. Thus, the flow is temporarily stopped and there is regurgitation.

The safe way to pour liquids from containers of this type is shown by position of container (A) in accompanying sketch. With this technic, the air is free to enter the container. There will be no regurgitation. If the opening is kept at the top, the pouring operation will be much cleaner and safer, and there will be much less waste.—*Henry D. Grimes, Lawrence, Mass.* (*In "Textile World"*).



Conveyor Screens As It Transports

Merely by installing a new wire belt of specific-size mesh, Red Dot Foods, Madison, Wis., has made a conveyor serve double duty—it screens as well as transports.

Thus, operations have been speeded, attendant labor needs reduced, and product quality improved.

Formerly, a close-mesh conveyor transported popped corn from the rotary ovens to the hand screening station, where unpopped grains were removed.

Now, popped corn discharges from ovens (see photo) onto a wire mesh conveyor with openings of a size which permit partially popped and unpopped kernels to fall through, while retaining the fully popped kernels and transporting them to a storage hopper. Thus, tedious hand screening is eliminated.

The discards fall into a series of deep trays beneath the conveyor. These are collected and their contents disposed of as cattle feed.—*FE Staff.*

Workers Play Part in Safety Program

By using a streamlined card system, the Miller Brewing Co., Milwaukee, has established a quick, effective way for the worker to route his comments, criticisms, ideas, and suggestions direct to the safety department, where comments can be properly channeled for prompt attention.

Cards are of two colors, white and buff, size 3 x 5 in., with space for date, clock number, foreman's name, employee's name, and department.

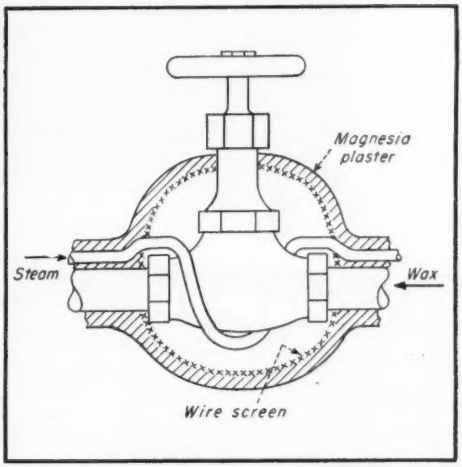
The foreman stamps his own name on each card, also writes the employee's clock number on it to make distribution easier.

Cards are sent around in rotation—white cards near the 5th of the month, buff cards about the 25th. The colors differentiate the periods of issue. After a short safety discussion by the foreman, either with individuals or a group, a card is given to the employee, who in turn places his name and department on it. Filled out, the card is placed in a container labeled "Safety Suggestions," one of which is located near each time clock.

Cards are collected daily and recorded. Suggestions are reviewed once each month. Five prize winners and several honorable mentions are picked by the Safety Committee, composed by seven supervisors from different departments. The prizes vary, ranging from a pair of safety shoes to a ball-point pen.

Program has promoted direct personal safety discussions between workers and foremen. It has stimulated enthusiasm for safety and better safety measures. This has raised every employee to the level of safety inspector, and generated a consistent flow of workable profitable ideas.

The program has been highly successful in cutting the company's accident rate down to an all-time low.—*From "Food Safety", bulletin issued by National Safety Council, Chicago.*



Keeps Product Temp Uniform in Valves

In the liquid-wax lines of the Lehigh Valley Dairy plant, Allentown, Pa., uniform temperature of wax is maintained in the valves by a unique method of encasing them, thus preventing any interruption of flow.

Wax, used by the dairy in coating milk containers, is delivered in tank trucks and maintained in liquid form at a controlled temperature of 160 deg. F. in steam-coil heated, insulated storage tanks.

All wax pipe lines are supplemented with steam tracer lines, which consist of ⅜ in. O. D. copper tubing. Tracers are attached to the wax lines and both are covered with an inch of 85 percent magnesia insulation.

However, valves are more difficult to keep heated than the lines. So here, the copper-tubing steam line is wound around both hand and relief valves. Then a spherical cage of fly screen is shaped about the valve and a covering of magnesia plaster is applied (see sketch).

The valve-stem packing nut is not covered but left accessible for adjustment. The steam tracer line keeps the air heated, providing ample heat transfer to all parts of the valve in contact with the wax.

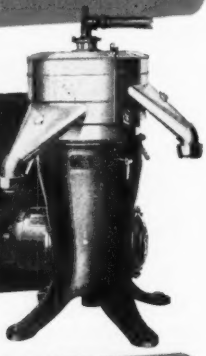
HERE ARE TYPICAL EXAMPLES OF 1-2-3-WAY CONTINUOUS CENTRIFUGAL SEPARATION

DO THEY GIVE YOU IDEAS?

1. Removing Crumbs from Cooking Fat

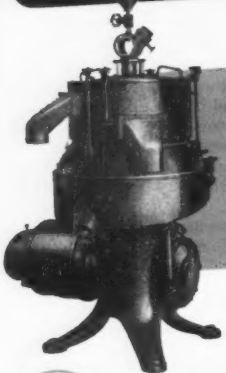
When the problem is the removal of a single solid from a single liquid, a De Laval Multiple Clarifier is used. This machine promptly clears the liquid, throwing out the undesirable solids, storing them in the bowl where they cannot harm the effluent.

The typical "example" has been used for 25 years by bakers of deep-fat fried products and by candy makers. Other instances are throwing dirt out of tomato puree, clarifying cereal, etc.



2. Polishing Olive Oil

Removing water from olive oil is an example of the separation of two liquids of different specific gravities, plus removal of a small quantity of solids. The liquids are discharged continuously, the solid is stored in the bowl. In addition to the olive oil, other examples are: recovering grease from chicken broth, recovering oil from mayonnaise, chemicals from coffee solution, etc.



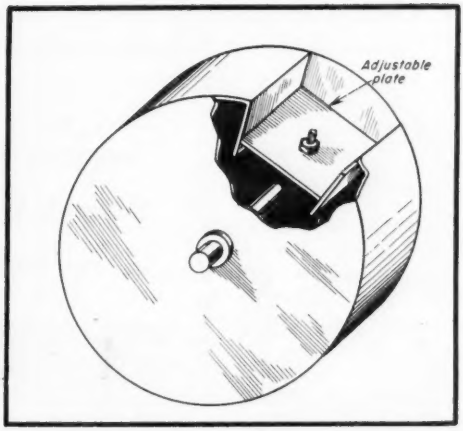
3. Separating Fish Oil from Press Liquor

This is only one example of the continuous separation of two liquids and simultaneous continuous removal of solids from the liquid mixture. The machine used is the De Laval "Nozzle-Matic" Separator, a versatile three-way centrifuge that is also used in the Food Industries to separate citrus oil from juice and particles of pulp and peel, to remove proteins and albumen from whey, etc.

All these machines have this in common—they all speed up the separation or clarification phase of a process. How about yours?

DE LAVAL

THE DE LAVAL SEPARATOR COMPANY
Poughkeepsie, New York 427 Randolph St., Chicago 6
DE LAVAL PACIFIC CO., 61 Beale St., San Francisco 5
THE DE LAVAL COMPANY, Limited, Peterborough, Ont.



Accurate Shop-Made Volume Filler

We are getting precise netweights with our own shop-made volumetric filler—and it cost us very little to make.

Problem faced was to fill both plain and cheese-coated popcorn accurately into bags and, through mechanization, to reduce hand labor as much as possible and thereby curb human errors involving weight. Even so, the extent of this operation did not appear to justify investment in a commercial netweight filling machine.

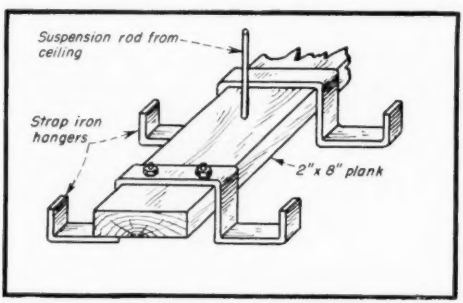
So we made our own—and it has proved to give maximum utilization of the little hand labor required, while delivering a uniform amount of product. It has another advantage: By a simple adjustment, volume of fill can be varied over a considerable range.

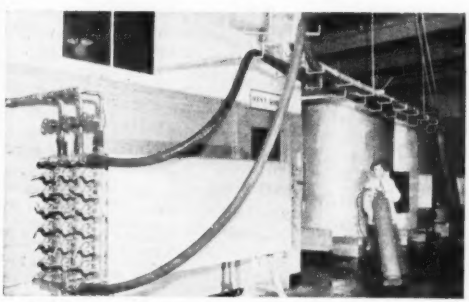
Here is the principle of the machine and how it is constructed: Installed below the outlet of a filling hopper is a stainless steel cylinder (see photo) rotating on a horizontal axis. Surface of the cylinder is recessed to the extent of about 1/6 of the circumference. Length of the recess is determined by the distance between the drum ends. Width is determined by the maximum fill desired.

In the bottom of the recess is an adjustable plate (sketch) with a hole in the center. Depth of this plate in the recess regulates the volume of product delivered at each revolution of the drum.

Variations in depth are obtained by tightening a nut on a machine screw, thus lowering the plate against spring tension from below. Springs lift it when nut is unscrewed.

Not only does the adjustable plate make it possible to regulate the volume for correct fill, but it also permits filling several sizes of bags with the same machine.—*L. C. Pagel, Technical Director, Red Dot Foods, Inc., Madison, Wis.*





Easy-to-Build Rack Clears Passageway

A simply constructed hose rack, suspended from the ceiling over an aisle leading from an entrance to our winery, has accomplished these objectives:

1. Curbed a serious accident hazard.
2. Speeded movement of persons and vehicles using aisle and entrance.
3. Removed expensive hose from a damage-hazard area.

In one processing operation, certain wines are circulated from insulated tanks through tube type coolers (photo) and back to the tanks. Either of two coolers, adjacent to each other, may be used to cool wine from a battery of storage tanks. Beer hose of varying lengths delivers wine to the coolers and then returns it to the battery of tanks.

Formerly, during this processing, two or more lengths of hose lay on the floor, between tanks and coolers, across a passageway used by foot and vehicle traffic. Now they are suspended overhead out of harm's way, as well as out of the way of traffic.

Rack is made (sketch) by shaping strap iron to fit over a 2 in. x 8 in. plank and to overhang, forming straight angled U's on both sides. Straps may be secured to plank by bolts or screws.

Assembly is suspended by rods from rafters, or other overhead structures, at the height desired, anchored where possible to walls to prevent side sway.—*Delfo Perrucci, G. F. Heublein & Bro., Hartford, Conn.*

BECKMAN—*the leading name in pH—presents another important advancement in instrumentation*

Announcing The BECKMAN MODEL N pH METER

Completely Portable!

Extremely Compact!

...and Really Rugged!

In the constantly expanding field of pH, there is wide demand for a *completely portable* battery-operated pH instrument that is low in price, light in weight, compact in size, and amply rugged to be used anywhere—in the orchard, in the oilfields, in textile mills, plating shops, mining and mill operations, food processing plants, laboratories . . . *anywhere*, without dependence upon outside power circuits.

The newly developed Beckman Model N pH Meter not only meets all these requirements, but also many more. Here are the highlights. Check them over. *Never before have unique advantages like these been combined into a single pH instrument!*

OPERATING SIMPLICITY AND ACCURACY . . .

- Accuracy to better than 0.05 pH.
- Low operating cost—less than 2c per hour.
- Built-in temperature compensation—0° to 100° C.
- Fast warm-up—less than 10 seconds.
- "Check Pointer" eliminates need for frequent buffer standardization.
- Batteries are easily checked with the regular panel controls—no need to disassemble the instrument. Clip-mounting of batteries eliminates need for soldering or wiring.

NEW COMPACTNESS AND RUGGEDNESS . . .

- All-metal case—cast aluminum with baked enamel finish to resist wear and corrosion.
- Splash-proof design—fully desiccated internally.
- Shock-proof—each tube is individually shock-mounted.
- Light weight—less than 8 lbs., complete.
- Small, compact—only 4" x 6" x 9½" overall.
- Equipped with the new Beckman Red Label Glass Electrode—virtually unbreakable, covers almost the entire pH range, usable from freezing to boiling.
- By far the most rugged overall construction of any pH meter.

GET ALL THE FACTS on this newest Beckman advancement in pH by contacting your nearest authorized Beckman instrument dealer. Or write direct!

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NEW **CONVENIENCE SIMPLICITY RUGGEDNESS**

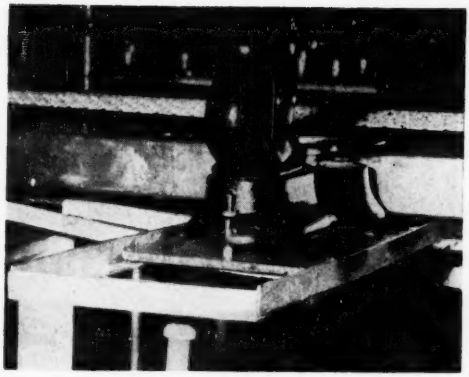
make the Beckman Model N a noteworthy advancement. The following features are typical . . .

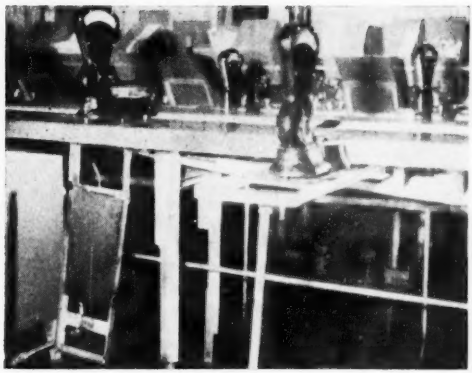
ELECTRODE SUPPORT ROTATES alongside case for maximum convenience in carrying. Instrument can be used in either horizontal position (shown at left) or vertical position (above)—whichever is handier.

CONVENIENT CONTROLS not only centralize all operating functions, but also permit checking amplifier circuits and battery condition without opening case or disturbing battery connections.

RUGGED, COMPACT DESIGN withstands rough field and plant service with negligible maintenance. Solid cast-aluminum case is strong, yet light in weight. Beckman Glass Electrode is virtually unbreakable!

There are many other important features designed into the Model N. Be sure to get the *complete* story on this new Beckman development!





Folding Tables Extend Conveyor Use

By hinging shop-made "disappearing tables" alongside our weighing-station conveyors, we have eliminated the need for additional processing lines.

Here is the story:

Poultry is weighed at each station, along the conveyors, on scales which rest on the new tables. Close-up photo at left shows how the table is fabricated from angle iron and pipe fittings.

Hinged underneath, the table swings below the conveyor when the single leg support of the table is removed.

This support is made of a length of ½-in. pipe, which fits into a recess in the floor. Upper end of the pipe slips into a nipple welded onto the lower side of the table.

If the pipe is loosely threaded into the nipple, (from which it can then be readily detached when the table is to be lowered), a greater degree of safety is obtained. Then the table cannot be accidentally raised to unseat the support. This averts any sudden folding of the scale platform under the conveyor and dumping the scale on the floor.

When the need arises to use the conveyor for general inspection work, common transport, or for spotting special-purpose stations, scales are eached away and their supporting tables are lowered under the conveyors (as seen at left in second photo) where they do not interfere with movements of workers along conveyor sides.

Space formerly occupied by weighing tables can then accommodate additional workers, increasing the productivity along the same length of double duty conveyors.—*Thomas W. Ward, Assistant Plant Engineer, C. A. Swanson & Sons, Salisbury, Md.*

Glass Wool Ends Infestation

Breeding of insects in railway box cars can be prevented at a cost of a few carpenter man-hours and enough Fiberglas wool to cover sides and ends of carriers.

Accumulations of grain, caked in the side walls of cars, often cannot be dislodged by hammering the inner lining. Even with most thorough cleaning, sufficient organic material remains in cracks and crevices to invite insect breeding.

Both laboratory and in-use experiments, conducted by large grain millers, have indicated the extent of grain infestation traceable to rail shipment and, at the same time, have led to the means to end the in-transit insect problems. The cure was to prevent any accumulation of "insect food" in the carriers, especially in inaccessible locations.

In 1947, a trial installation of Fiberglas was made, the wool being placed just in the ends of a test car. After three years of service, ends and sidewalls of the car were removed and the contents examined. Protected ends were free of all types or forms of infestation, whereas large accumulations of grain and organic materials were recovered from cracks and crevices in the unprotected side lining. Analysis of this material showed many live insects and evidence of many past generations.

This is how the Fiberglas is applied: After car lining is removed, steel ends and nailing strips are moisture proofed with an asphalt emulsion. Then blankets of the wool, 2 in. thick and 24 in. wide, with length corresponding to the width of the cars, are secured to the nailing strips. This holds the wool in place while the wood lining is replaced. All voids are filled as the lining compresses the wool. Application of wool to side walls is similar to that for car ends.

Preparation of the ends of a freight car and the installation of the material requires approximately one man-hour on the part of two carpenters and about 180 sq. ft. of the wool. The material and labor required to proof the side walls of a car depends on the size of the carrier.

Glass wool accomplishes two things: First, all space is filled, leaving no place for insect-supporting food dusts to accumulate. Second, insect penetration of the wool is limited; and such penetration means extinction, for insects do not thrive on glass.—*Reginald S. Jackson, Flournoy & Gibbs, Toledo, Ohio.*

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SHIPPING

Protect

MULTICOLOR

MANY HAZARDS OF SHIPPING ARE ELIMINATED WITH GAIR CONTAINERS

Gair Corrugated Containers are so scientifically constructed that they offer the utmost PROTECTION against the many hazards of shipping... truly amazing how they withstand tremendous knocking about and rough usage.

Without obligation Robert Gair offers a helping hand in solving shipping container problems.

WRITE TODAY for samples

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PAPERBOARD • FOLDING

CONTAINERS

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FOLDING CARTONS

MANY PRODUCTS
SELL ON SIGHT WITH
GAIR MULTICOLOR CARTONS

Smartly designed and brilliant multicolor Folding Cartons by GAIR are solving packaging problems for many manufacturers who are as meticulous about their packaging as they are about their famous products.

Sales, profits and prestige are increased with the SELL-ON-SIGHT appeal of GAIR MULTICOLOR CARTONS.

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WITH **VEELOS** THE ADJUSTABLE V-BELT

You Always have the Right Size Belt When You Need It!

When endless v-belts fail and your stockroom does not have the size you need . . . that means loss of time and production. But if you're wise and have Veelos, the adjustable v-belt, in stock, this can't happen to you.

With Veelos, *any size* v-belt can be made up right from a single reel. Just four reels of Veelos in the O, A, B and C widths can replace up to *316* sizes of endless v-belts on any drive in your plant. If your machines call for only one or two widths, you stock only those reels of Veelos and *you always have the right size belt when you need it.*

Veelos has other advantages, too. Replacement time is less (never necessary to remove outboard bearings). Matched sets that stay matched can be made up instantly. You get full, vibrationless, power delivery because belt tension can be held uniform.

For full production, always— standardize on Veelos, the adjustable v-belt. Write for your copy of the VEELOS DATA BOOK today.

VEELOS
THE LINK
V-BELT

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also double V in A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

MANHEIM MANUFACTURING & BELTING COMPANY • MANHEIM, PA.

Food Sales increase 15%* when ZEST® is added!

*Test reveals *regular* cafeteria customers bought *15% more food* when ZEST Monosodium Glutamate was used!

It's fresh, natural flavor that sells food. Tests prove it. You have always known it. Now you can sell more food than ever before by guarding the flavor appeal of your foods with ZEST . . . the miracle seasoning that ends gradual "flavor fading" in processed foods. Alert food processors everywhere are discovering the advantages of using ZEST in a wide range of canned and frozen foods.

See how Staley's Monosodium Glutamate—*by magnifying natural flavor*—can sell more canned or frozen foods for you!

ZEST is Staley's 99+% pure, instantly soluble Monosodium Glutamate. It brings out every bit of the natural food flavor appeal . . . yet adds no flavor, no aroma, no color of its own. You can magnify the flavor of meats, vegetables, seafood, chilies, stews, chowders, gravies and sauces. Simple to use, ZEST may be automatically added with your present equipment during processing . . . without any change in your formulas.

Improve the flavor of your processed foods . . . increase sales and profits as many leading food processors are now doing. Get the full flavor complete story of ZEST in processed foods . . . mail the coupon now!

ZEST®

Staley's 99+% Pure Monosodium Glutamate

A. E. STALEY MFG. CO.—Decatur, Ill., U.S.A.

Mail This Coupon Today!

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Gentlemen:
I'm interested in boosting my sales with ZEST seasoning. Send me all the details right away!

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*Address*_____

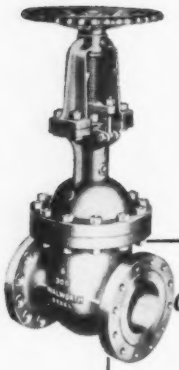
*City*_____ *Zone*____ *State*_____

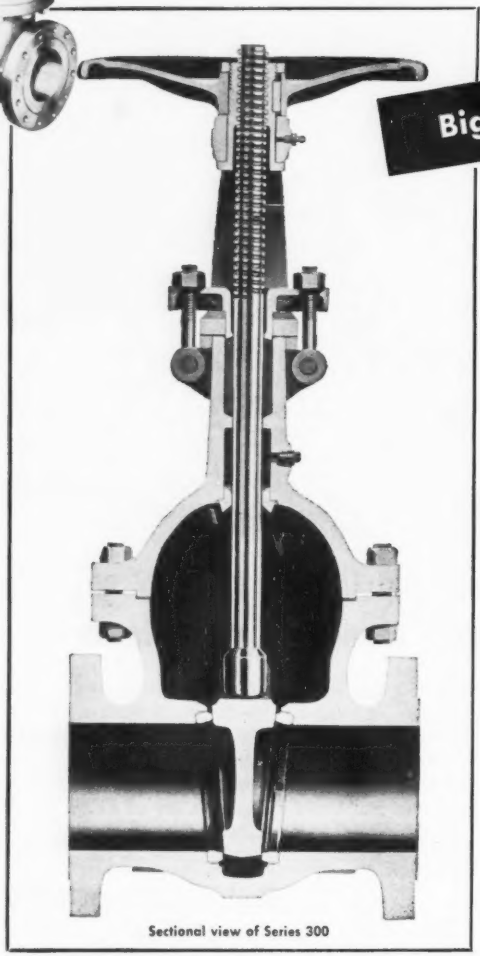
WALWORTH

Cast Steel Gate Valves

Series 150 and 300

Wedge Gate — Outside Screw and Yoke





Sectional view of Series 300

Big 8-Point Superiority!

Gland clearances are such that stem cannot be scored if gland should be tightened unevenly.

Deep Stuffing Boxes in all sizes (2″ to 24″) insure tightness and maximum packing life – costly leaks are eliminated.

Bonnets and Bodies are engineered to withstand pressure and minimize distortion – they're tough, durable, dependable.

Heavy Steel Walls provide extra strength and longer life.

Integral Body Guide Rib Faces are machined to insure accurate disc seating.

Seat Rings are bottom seated – not flange type. No recess exists at back of ring – hence no turbulence, erosion, or pressure drop.

Streamlined Ports allow high velocity, non-turbulent flow, and reduce the possibility of erosion.

Valves regularly have flanged ends. They can be supplied with ends for butt welding. Roller bearing yokes are available. On valves 5 inches and larger, by-passes can be furnished.

For Series 600 and higher, we recommend Walworth Pressure-Seal Steel Gate Valves.

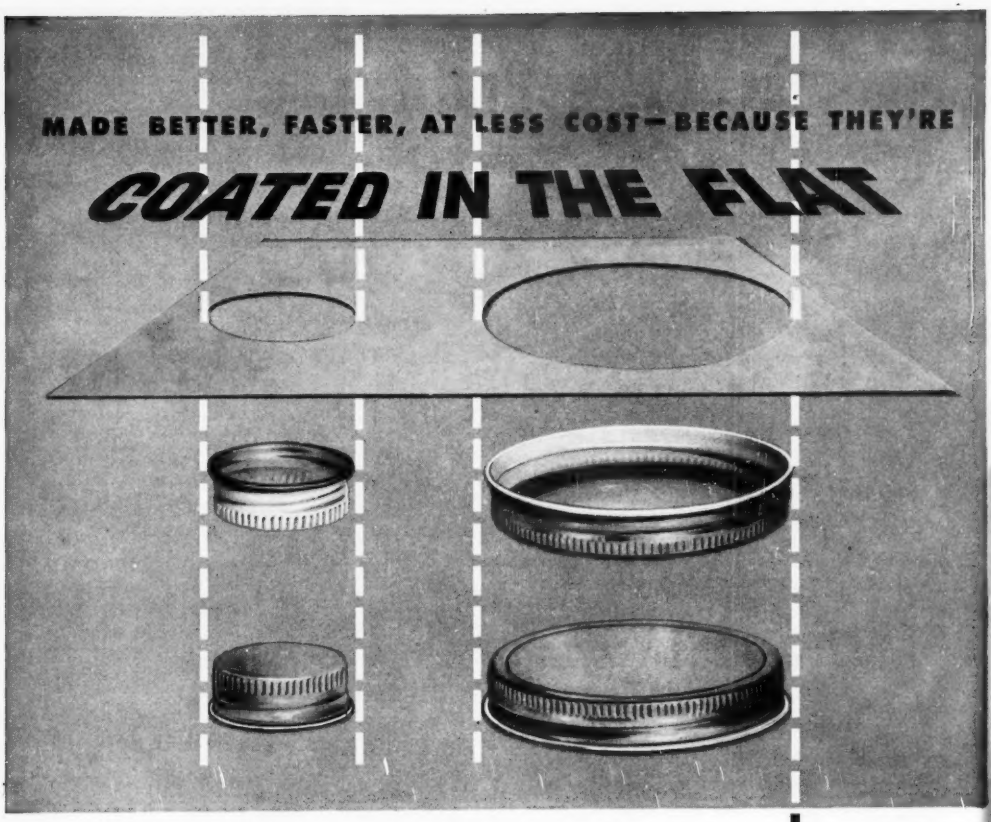
For further information on Walworth Cast Steel Gate Valves, see your local Walworth distributor, or write:

WALWORTH

valves and fittings

60 EAST 42nd STREET, NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD



And the secret lies in tough, flexible coatings based on VINYLITE Brand Resins.

You see, after a coating of this tenacious material, the sheet metal is formed, drawn, crimped and stamped—without a trace of damage to the coating itself. And the job, colored as desired, is complete! In spite of all the processing, the coatings are not damaged.

In a class by themselves, these remarkable coatings, based on VINYLITE Resins, not only take the abuse of stamping and forming machines. They also maintain their bull-dog adhesion and bond for years of hard service.

Add to this: They're odorless, tasteless, non-toxic, and extremely resistant to moisture, oils, greases, alkalies, most strong acids and other chemicals.

You can see why they're virtually unbeatable as coatings on closures, containers, tanks, vats, equipment, for foods, pharmaceuticals, and a host of other solids and liquids that must be processed, packaged, shipped, preserved and protected.

Let us tell you more facts—help you with the correct use or formulation of durable, flexible, colorful, money-saving coatings based on VINYLITE Brand Resins. Write Dept. LF-74.

Data courtesy Crown Cork & Seal Company, Eastern Ave. and Kresson St., Baltimore 3, Md.

Vinylite

RESINS

TRADE MARK

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A Division of
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30 East 42nd Street, New York 17, N. Y.

Squeezing Extra Profit

out of the orange concentrate business

It's a remarkable product—this orange concentrate . . . a boon to housewives, a welcome relief to household budgets, and a vast market for the enterprising producers.

As might be expected, these producers have selected the most advanced equipment in order to produce at lowest costs—maximum profit. Included are Worthington Worthite Centrifugal Pumps with mechanical seals. Many installations in Florida and California are now in their third season, continually providing worthwhile savings through:

Exceptional resistance to corrosion—no repairs or shutdown.

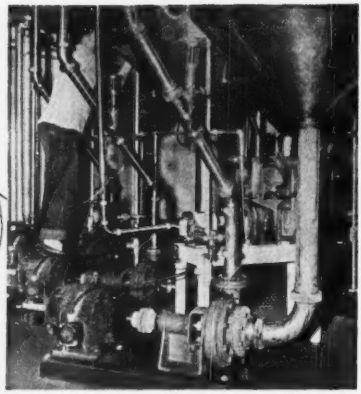
Maintained high vacuum—no air in-leakage.

Easy cleaning, without opening for steaming—by circulating the cleaning chemical through the evaporators.

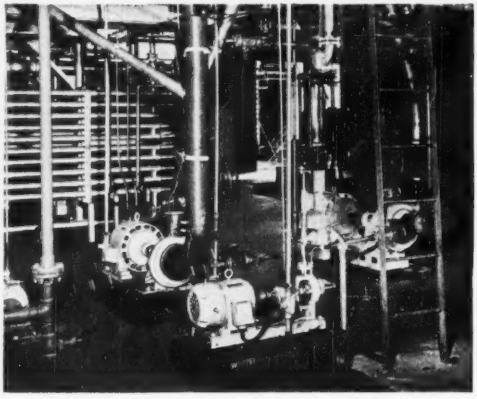
Low power consumption for circulating the heavy viscous concentrate.

Quiet operation without cavitation with unusually low required NPSH.

First cost is low, too. Investigate Worthington Worthite Pumps for *any* acid or alkali applications—weak or strong. Worthington Worthite Pumps are built in standard sizes, from 1 to 20,000 gpm. For further proof that *there's more worth in Worthington*, call our nearest District Office or write to Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, New Jersey.



FLORIDA CITRUS CANNERS COOPERATIVE (Lake Wales, Fla.) uses Worthington Worthite Pumps (mechanical-seal type) to circulate concentrate in a Mojonnier Bros. evaporator, 29.5" to 29.7" Hg vacuum, where fresh, depulped orange juice is concentrated at low temperature to ⅛ its original water volume. These pumps are now in their third season without repair.

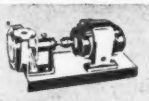


MINUTE MAID CORP. (Plymouth, Fla.) installation uses Worthington Worthite Pumps (mechanical-seal type) on this Buflovak Evaporator. Large pumps in rear circulate the orange juice, small pump discharges concentrate through Rotameter from 29.5" Hg vacuum to holding tank under atmospheric pressure.

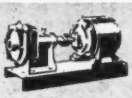
WORTHINGTON

C.I.3

THE WORLD'S BROADEST LINE ASSURES YOU THE RIGHT PUMP FOR EVERY JOB

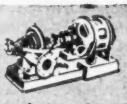


Types C G and C G L. Sizes ¾" to 10". Capacities to 5000 GPM; heads to 200 ft. Liquid ends of WORTHITE alloy.



Type C F. Sizes 1" to 4". Capacities to 1000 GPM; heads to 130 ft. Standard, all iron and all bronze.

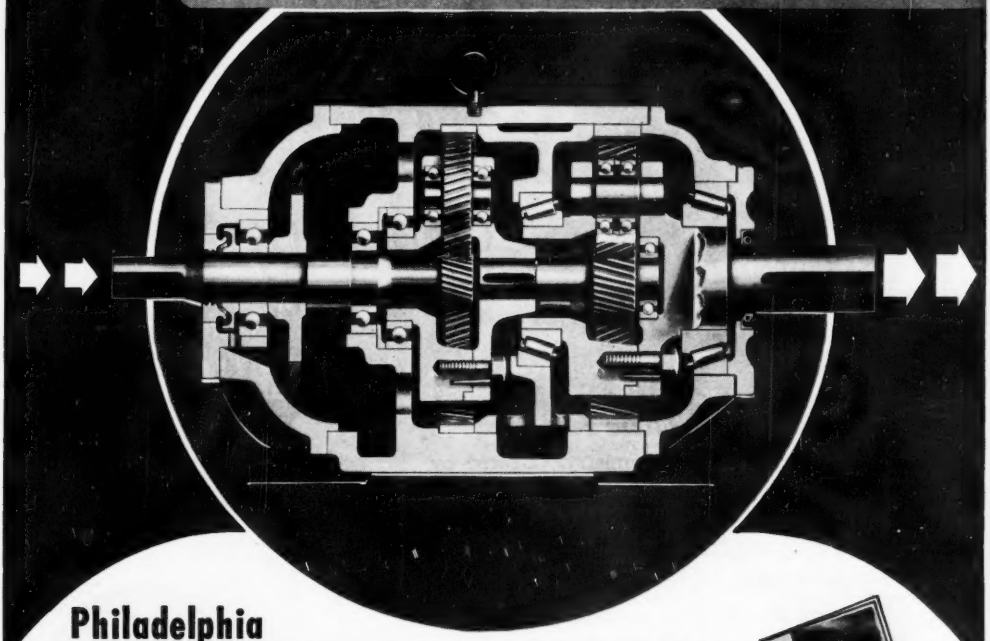
Type C Q. Sizes 1½" to 3". Capacities to 600 GPM; heads to 130 ft. at 1750 RPM. Closed impeller. WORTHITE shaft and fittings.



Type L. Sizes 3" to 8". Capacities to 2250 GPM; heads to 300 ft. Single stage volute. For general service.

THE ULTIMATE

IN STRAIGHT-LINE DRIVES

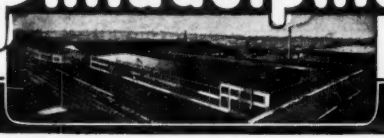


Philadelphia
PLANETARY SPEED REDUCERS

Where a separate, "straight line" reduction drive is preferred . . . The Philadelphia Planetary Reducer is *the answer* . . . this unit is distinctly superior to old style Spur Gear Reducers, and has many advantages over parallel shaft reducers . . . Input and output shafts are "in line", which greatly simplifies the base plate design and improves the appearance of the complete drive. Another point . . . The Philadelphia Planetary Unit is extremely compact and designed for continuous, rugged service—and is Dust, Dirt, Moisture and Fume-proof. Housings are oil-tight and all units carry "official" A.G.M.A. Rating Tag. For overload protection, they may be equipped with the "exclusive" Philadelphia PlaneTorque Control. Units are available for drives up to 140 horsepower and in ratios up to 106.1 to 1.

Write on your Business Letterhead for Bulletin 100.

Philadelphia Gear Works, INC.



ERIE AVE. AND G ST., PHILADELPHIA 34, PA.

NEW YORK • PITTSBURGH • CHICAGO • HOUSTON • LYNCHBURG, VA.

IN CANADA: WILLIAM AND J. G. GREEY LIMITED, TORONTO

Industrial Gears and Speed Reducers
LimiTorque Valve Controls

Make the most of this combination....

1. ***Continuing basic research . . .*** in corn products chemistry, directed by the foremost research men in the industry.

2. ***Technical and engineering services . . .*** to help you apply new methods and new products to your production setup. No obligation for on-the-spot studies. (Write our Technical Sales Department.)

3. ***Fine products of uniform quality*** . . . from a dependable, large volume source of supply.

CERELOSE BRAND dextrose

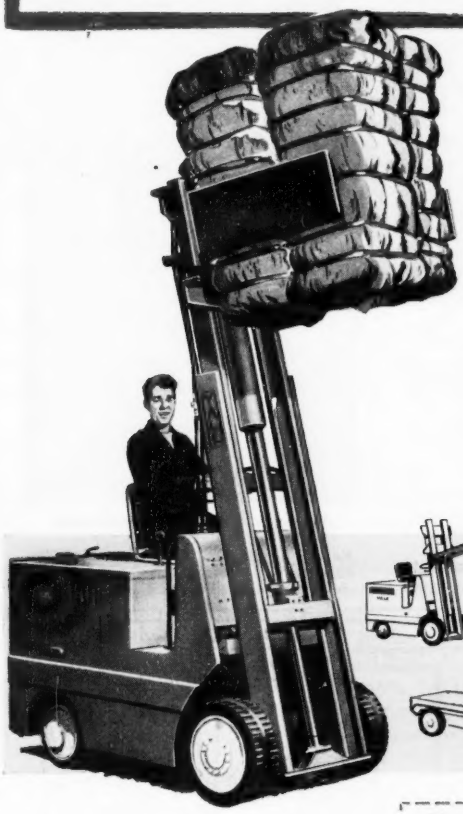
PURITOSE BRAND CORN SYRUP

GLOBE BRAND CORN SYRUP

● Globe, Cerelose, Puritose, Buffalo and Hudson River are registered trade-marks of Corn Products Refining Company, New York, N. Y.

CORN PRODUCTS REFINING COMPANY, 17 BATTERY PLACE, NEW YORK 4, N. Y.

THE BIG 89% PROVES SUPERIORITY OF YALE ELECTRIC TRUCKS

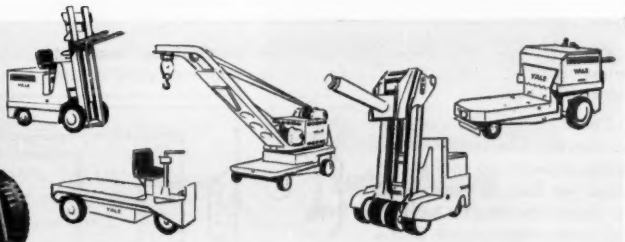


89% of the Yale Electric Trucks sold today are bought by previous users... so satisfied with Yale performance and Yale economy that Yale is their choice again.

THESE USERS had ample opportunity to make every on-the-job test—to compare Yale Electric Trucks with any others—to get dollars-and-cents proof of how Yale saves man-hours, steps up production, speeds all materials handling jobs.

These users found Yale Electric Trucks pay for themselves faster...then go on giving many years of service... taking the toughest jobs right in stride.

If you're not already among the users of Yale Electric Trucks, be guided by the Big 89% and this proven record of satisfaction. Ask your Yale Representative to show you the actual performance records which persuade Yale users to buy Yale Electric Trucks again and again.



YALE & TOWNE

The Yale & Towne Manufacturing Co., Philadelphia 15, Pa.

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SEND THIS COUPON TODAY

The Yale & Towne Manufacturing Co., Dept. 4612
Roosevelt Boulevard & Haldeman Ave., Philadelphia 15, Pa.

I am interested in cutting my materials handling costs.

☐ Please have your local representative call on me.
☐ Please send me free detailed literature.

Name_____ Title_____

Company_____

Street_____ City_____ State_____

In Canada write: The Yale & Towne Manufacturing Company, St. Catharines, Ontario

YALE GAS AND ELECTRIC INDUSTRIAL TRUCKS • YALE WORKSAVERS • YALE HAND TRUCKS • YALE HAND AND ELECTRIC HOISTS

With This NEW Improvement Niagara "No-Frost Method" puts you a big step ahead in trouble-free, automatic refrigeration or freezing

Niagara "No-Frost Method" keeps frost and ice COMPLETELY OUT of your cooling, chilling, freezing or cold storage.

It uses Niagara No Frost Liquid Spray to keep frost and ice from ever forming. It gives you, automatically, refrigeration with no defrosting, and full capacity NEVER cut down by ice building up progressively on refrigeration coils.

Now, a NEW design No Frost Liquid concentrator, using a new principle, takes away moisture as fast as it is condensed by evaporating it at low temperature—not boiling it away at high temperature. It has 14 times the capacity of the old method per dollar of investment—one concentrator will handle a battery of high capacity spray coolers.

This gives you more refrigeration at lower cost; less machinery in less space. You operate at high suction pressure, saving power and wear and tear on compressors.

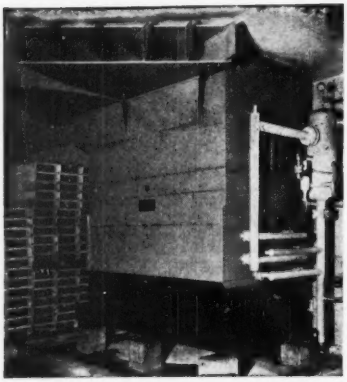
The extra capacity and lower cost both for equipment and operating makes this method advantageous for every type of refrigeration use—both for freezing and for moderate temperatures—for large "live" loads as in meat chilling or in fruit and vegetable pre-cooling—for rooms that are filled and emptied of product daily, such as milk rooms and terminal storage warehouses.

You get true trouble-free refrigeration . . . No brine . . . no salt solution . . . no dirt . . . no mess . . . It is entirely clean; you get rid of dirt and odors. You reduce both equipment and operating costs.

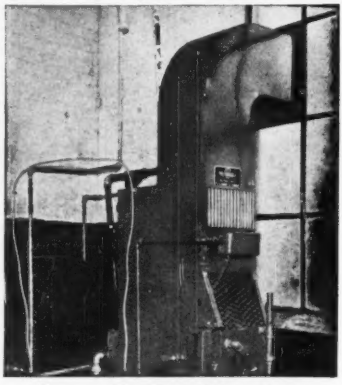
With Niagara "No-Frost Method" you easily keep constant temperature of products in your rooms, improve quality, get more production.

There are two series of concentrators: one, with evaporating capacity up to 6 gal. of water per hour, is economical for small freezing or hardening rooms, milk rooms, single room storage. The other, evaporating up to 36 gal. per hour, serves a battery of large coolers as in multiple floor cold storages, large chilling, freezing or pre-cooling plants.

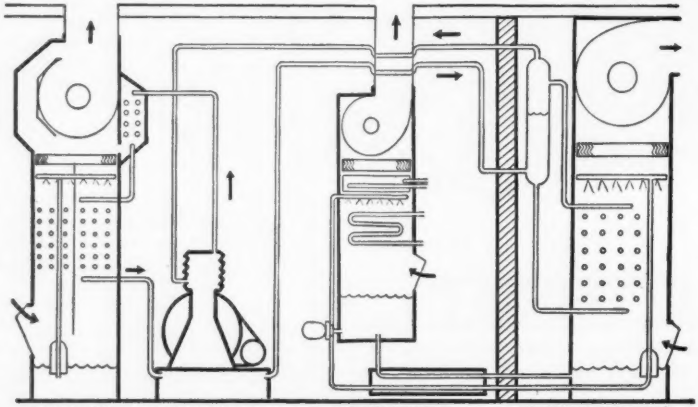
For complete information write to the Niagara Blower Company, Dept. FI, 405 Lexington Avenue, New York 17, New York.



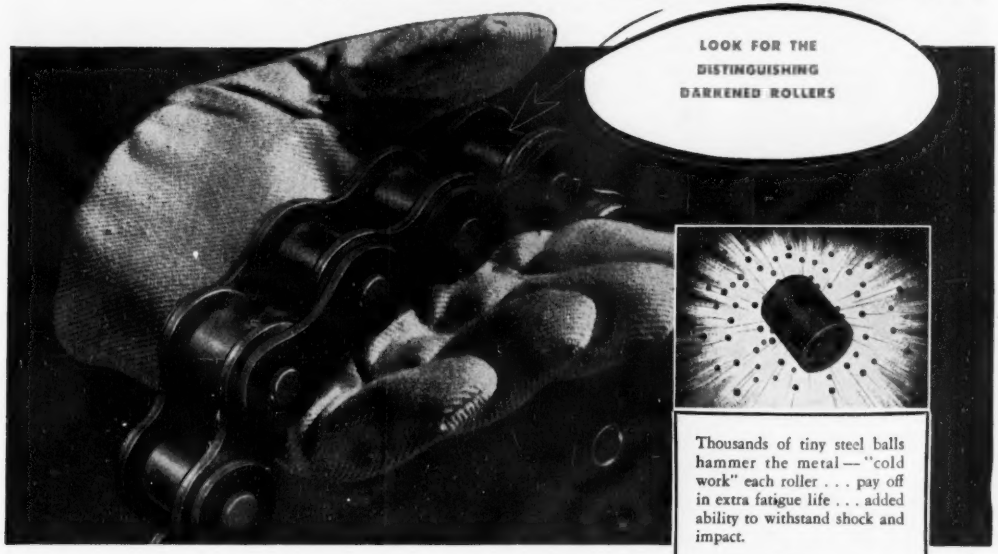
Niagara No Frost Spray Coolers
PATENTED
With the "No-Frost Method" you always get the full amount of refrigeration your compressor will deliver and for which you are now paying. If you need extra capacity, the Niagara "No-Frost Method" can help you get it with your present compressor.



Niagara No Frost Concentrator
PATENTED
No salt solution . . . No brine . . . The Niagara "No-Frost Method" gives you a clean system, clean rooms, clean equipment.



Here's how you can tell the chain with SHOT-PEENED rollers...



Thousands of tiny steel balls hammer the metal — "cold work" each roller . . . pay off in extra fatigue life . . . added ability to withstand shock and impact.

...the chain that has extra fatigue life

YES, you want to be sure you get shot-peened rollers on the next roller chain you buy. Shot-peening gives rollers the extra fatigue life needed to take repeated shock and impact loads.

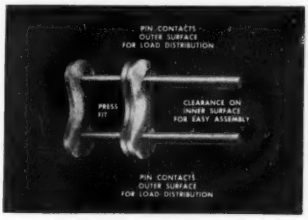
These chains are high in tensile strength, durable under severe loads, relatively light in weight and uniform in pitch. This accounts for their wide acceptance throughout industry for both drive and conveying purposes.

Thanks to constant research and precise manufacturing controls, every Link-Belt Precision Steel Roller Chain meets the highest standards for uniform strength. You get a positive, long-life drive — unaffected by heat, cold or moisture.

Link-Belt Roller Chain is available in single or multiple widths, in 3/8 to 3 in. single and double pitch. For all the facts, call your nearest Link-Belt office.

LINK-BELT

PRECISION STEEL ROLLER CHAIN


PIN CONTACTS OUTER SURFACE FOR LOAD DISTRIBUTION
PRESS FIT
CLEARANCE ON INNER SURFACE FOR EASY ASSEMBLY
PIN CONTACTS OUTER SURFACE FOR LOAD DISTRIBUTION

Easier coupling
and uncoupling without sacrificing load distribution

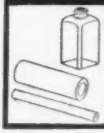
Patented E-Z Assembly feature of Link-Belt Precision Steel Roller Chain has won world-wide approval. Coupling and uncoupling of multiple width chains — right on the job — is far easier. There's absolutely no sacrifice of load distribution . . . no loss of the chain's remarkable performance. Press-fits between chain pins and middle bars have been modified. But full load carrying capacity across the entire width of the chain has been maintained.

LINK-BELT COMPANY: Indianapolis 6, Chicago 9, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices, Factory Branch Stores and Distributors in principal cities. 12,382

For The Blatz Brewing Company which uses Standard-Knapp packers and conveyors in its new bottling plant. "We certainly are happy," reports Blatz, "with the performance which our Standard-Knapp equipment has rendered during three years of operation in our new bottling plant. This department has recorded an amazingly high degree of efficiency in regular evaluations and much of that efficiency is due to the continued and dependable operation of Standard-Knapp packers."

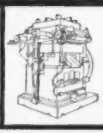
Only the best is

OTHER EMHART PRODUCTS INCLUDE:



PLASTIC BOTTLES, RODS, TUBES, SPECIAL SHAPES
PLAX CORPORATION
Subsidiary of Emhart Mfg. Co.
HARTFORD 1, CONNECTICUT

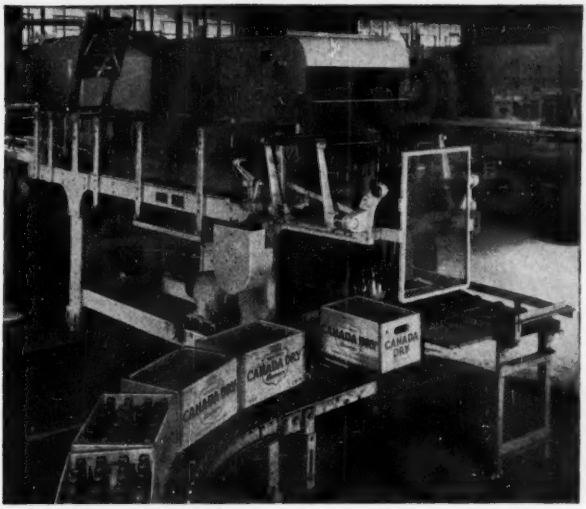
PREMIUM QUALITY STAMPING PRESSES
THE V & O PRESS CO.
Division of Emhart Mfg. Co.
HUDSON, NEW YORK



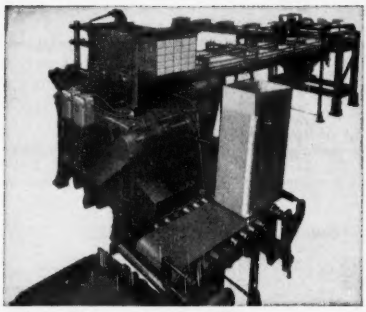
HIGH SPEED AUTOMATIC PRESSES
HENRY & WRIGHT
Division of Emhart Mfg. Co.
HARTFORD 5, CONNECTICUT

GLASS MAKING MACHINES
HARTFORD-EMPIRE CO.
Division of Emhart Mfg. Co.
HARTFORD 2, CONNECTICUT

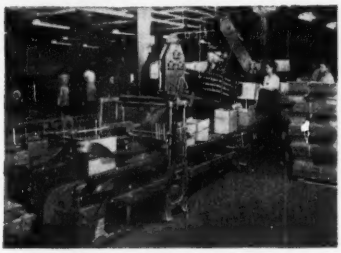
In the field of automatic packaging equipment



For Canada Dry where Standard-Knapp bottle packers help this famous company maintain its production lines at top efficiency. Standard-Knapp bottle packers—and other automatic packaging machines—are the choice of leaders in every field seeking speed and dependability now and for the years ahead.



For American Tobacco which keeps its packaging lines moving at peak efficiency with the aid of Standard-Knapp gluers and sealers, collectors and carton packers. In the field of automatic packaging, Standard-Knapp machines are automatically preferred.



For The Food Industry

Standard-Knapp machines are automatically and efficiently unloading empty bottles . . . rinsing glass containers . . . labelling cans and bottles . . . packing filled cans, bottles, cartons and bags into shipping cases . . . gluing and sealing shipping cases . . . printing, coding and dating.

good enough

FACT-PACKED CATALOGS

Want to review Standard-Knapp automatic packaging machines in detail? Our catalogs will give you some eye-opening facts.

Please write Dept. F, Standard-Knapp, Portland, Connecticut.

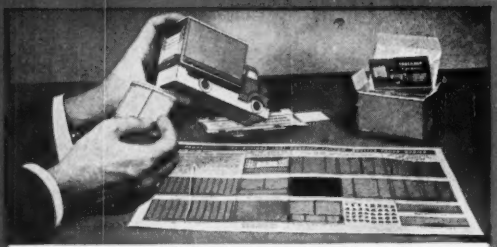
STANDARD-KNAPP

DIVISION OF
EMHART MFG. CO.

PORTLAND, CONNECTICUT

FRUEHAUF "Unit-Built" TRUCK BODIES

are custom-fitted to your job... with over 500 body options!



Fruehauf Model Kit lets you "make up" your body—with all options—in miniature.

1. Open Top 2. Solid Rear End 3. Solid Sides 4. Single Side Door 5. Double Side Door 6. Narrow Double Rear Doors 7. Full Width Rear Doors

8. No Rear Door 9. Express Gate Rear 10. Tailgate (Outside Type) 11. Tailgate (Flush Type) 12. Tailgate (Doors Above)

Count all the advantages of buying a Fruehauf before you consider any other Truck Body: 1. Over 500 options. 2. All steel, "Unit-Built" construction. 3. Straight frame or wheelhousing . . . all popular lengths. 4. Fast assembling, mounting and painting service at 80 Branches coast-to-coast. 5. Custom-built quality at production-line prices.

FRUEHAUF Truck Bodies

"ENGINEERED TRANSPORTATION"

FREE CATALOG AND MODEL KIT!

See your local Truck Dealer or Fruehauf man, or write

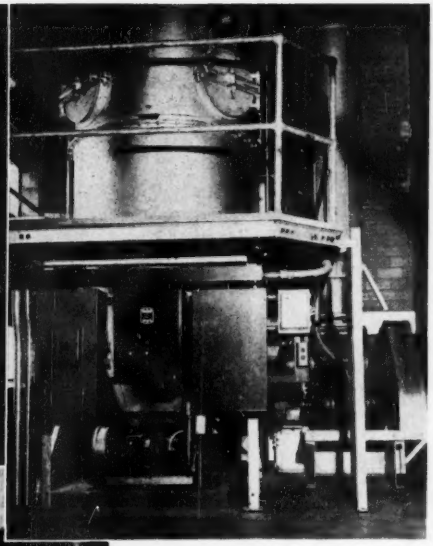
FRUEHAUF TRAILER COMPANY

BODY DIVISION, DETROIT 32, MICH.

UNLOAD FLOUR FROM BAGS OR BULK CARS

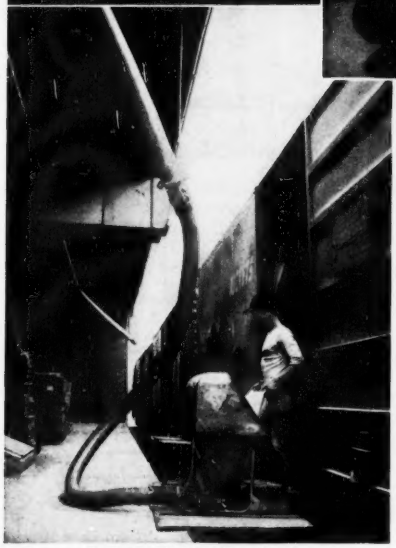
WITH The AIRVEYOR®

Safely Simply Efficiently Economically !



The heart of the Airveyor . . . Filter, separating material from conveying air, with 100 percent visible retention of dust . . . exhauster on right, background.

Attaching flexible metal hose to hopper of a Trans-Flo bulk car, unloading semolina.



Airveyor unloading semolina from bags shipped in box car. Bags are opened and contents dumped into portable hopper, to which the same flexible metal hose, used for unloading bulk cars, is attached. As bags are removed adjacent to the car door, the hopper is moved further back into the car, for more efficient unloading.

It doesn't matter whether you receive flour in bags or bulk, the Airveyor can be adapted to handle it in either manner . . . efficiently, rapidly, and without loss of material.

The Airveyor will unload and convey, in one operation, from cars to storage, or direct to process, if desired. The system can be so arranged as to blend while reclaiming from storage . . . can be designed to convey to any number of delivery points, in a dustless, sanitary manner. No mechanical conveyors need be used . . . no bothersome cleaning . . . the system is self-scouring.

During the past few years the Airveyor has been installed for the handling of flour, and other food products, in 16 plants, with a total of 31 systems in operation. In addition to this, there are under construction, 13 systems for installation in five plants.

If costs for conveying flour and other similar products have been cutting into profits . . . if labor and maintenance costs have been climbing . . . you'll find it profitable to call in a Fuller engineer. Chances are he can show you how minimum expenditure can bring you a conveying system that means maximum operating efficiency, and consequent improvement in profits.

Fuller

**DRY MATERIAL CONVEYING SYSTEMS AND COOLERS—
COMPRESSORS AND VACUUM PUMPS—
FEEDERS AND ASSOCIATED EQUIPMENT**

**FULLER COMPANY, Catasauqua, Pa.
Chicago 3—120 So. LaSalle St.
San Francisco 4—420 Chancery Bldg.**

A-127

Artist: Honoré Sharrer

Horace Mann on the nature of education

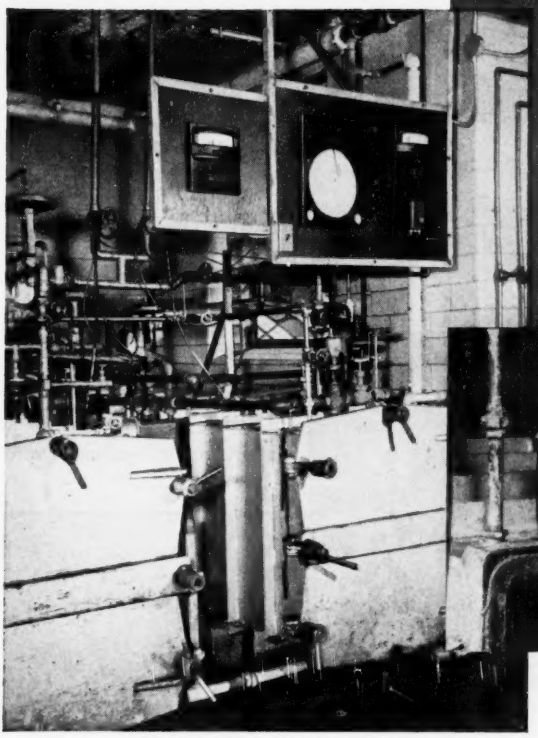
Property and labor in different classes are essentially antagonistic; but property and labor in the same class are essentially fraternal. . . . Education, then, beyond all other devices of human origin, is the great equalizer of the conditions of men—the balance wheel of the social machinery.

(Lectures and Annual Reports on Education, 1867)

CONTAINER CORPORATION OF AMERICA

DOUBLE-DUTY RETORTS

. . . cut glass breakage, increase plant production



HAM BOILING is controlled to give automatic shut-off and signal when desired internal meat temperature is reached.

AUTOMATIC PRESSURE COOK for glass-packed meats—with controlled rate of rise, holding and pressure cool—is provided by time-pattern control system.

- Glass breakage dropped from 15% to zero.
- Use of retorts is so satisfactory that operators now avoid using conventional boiling tanks.
- Stepped-up production enabled 3-man crew to process 64,000 pounds of meat in 10 days, to complete a rush order.
- Scarring of jar lids, due to violent retort agitation, is eliminated.
- Greater uniformity and superior texture and flavor resulted immediately . . . in addition to increased production and safer operation.

Millar Brothers & Co., Philadelphia meat packer, has achieved a marked increase in plant production by cooking glass-packed meats and boiling hams and other products *in the same horizontal retorts.*

Pickled tongues, meat loaves and other specialties are processed two or three times a week . . . hams and other products are boiled (at atmospheric pressure) in the same retorts the rest of the time.

A custom-built Honeywell control system makes possible this greater versatility in retort scheduling. Check the list at the left to learn what happened when the system went into operation.

For further details on this installation . . . or on a Honeywell control system for some other food process . . . write to Station 40, MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division,* 4502 Wayne Ave., Philadelphia 44, Pa.

MINNEAPOLIS **Honeywell**

Brown Instruments

Congratulations to the Food Industry of America

Enriched foods mean better living for the American people. Ten years ago, when American millers and bakers introduced enriched flour and bread, they launched a new era in nutrition.

Since then, faith in the Enrichment Program has been reaffirmed many times. The human values of enriched foods have been factually established in terms of higher health levels and improved mental and physical vigor.

As we enter the second decade of Enrichment, Merck salutes the Baking and Milling Industries of America for this accomplishment.

MERCK VITAMIN PRODUCTS FOR ENRICHMENT AND FORTIFICATION:

VITAMIN B_1

Thiamine Hydrochloride (*Vitamin B_1 Hydrochloride*)

Thiamine Mononitrate (*Vitamin B_1 Mononitrate*)

RIBOFLAVIN (*Vitamin B_2*)

NIACIN (*Nicotinic Acid*)

ASCORBIC ACID (*Vitamin C*)

Merck Enrichment Ingredients for Millers, Bakers, Cereal and Macaroni Manufacturers—Merck Vitamin Mixtures for Flour Enrichment—Merck Bread-Enrichment Wafers—Merck Vitamin Mixtures for Corn Products Enrichment—Merck Vitamin Mixtures and Wafers for Macaroni Enrichment.

Merck is Proud to Have Played a Part in the Enrichment Program

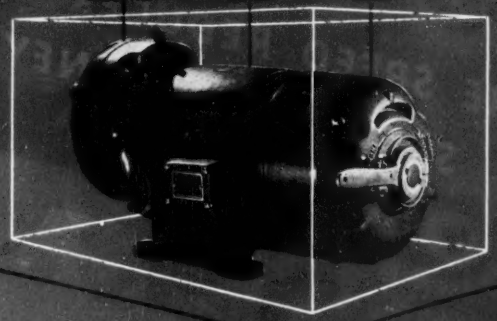
For several years before the birth of Enrichment, Merck research and production staffs had been at work on the synthesis and manufacture of thiamine, riboflavin, niacin, and other pure vitamins. When they were needed for the Enrichment Program, as well as for general food fortification, Merck was ready.

We are proud to have been associated with the food industry throughout these ten historic years of Enrichment.

MERCK VITAMIN PRODUCTS

For Enrichment and Fortification

MERCK & CO., INC.
Manufacturing Chemists
RAHWAY, NEW JERSEY
In Canada: MERCK & CO. Limited—Montreal



Don't put up with make shift assemblies when it is so easy to get the RIGHT horsepower, the RIGHT shaft speed, the RIGHT construction features, the RIGHT mounting . . . all combined into one compact, easy to use power package.

All in one package

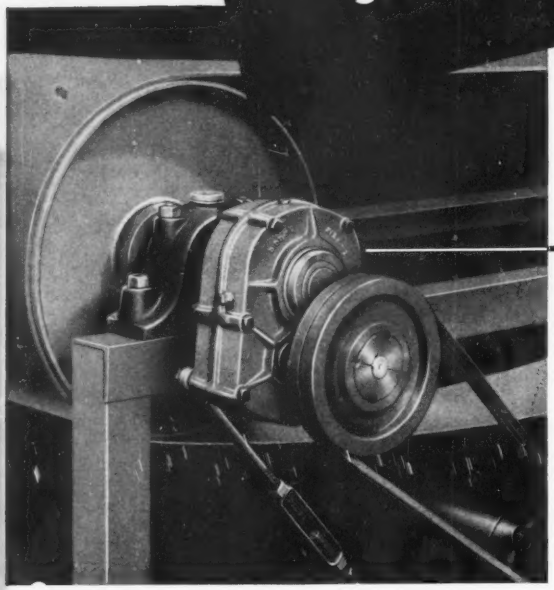
Master Gearmotors, available in millions on millions of combinations of types and ratings, permit you to use a power drive on each job that's just right . . . a power drive that will add greatly to the compactness, appearance, and economy of each of your applications.

Use Master Gearmotors to increase the salability of your motor-driven products . . . improve the economy and productivity of your plant equipment. They're the horsesense way to use horsepower.

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO

MASTER GEARMOTORS

THE SPEED REDUCER THAT SAVES YOU MONEY!



Dodge

Torque-Arm

America's Most Complete Line of Shaft-Mounted Speed Reducers

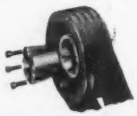
- No special engineering required. No foundation to provide. No flexible couplings. No sliding base. No "lining-up" difficulties. No expensive installation. Stock TAPER-LOCK sheaves prescribed for each job to provide desired speeds. Application to other machines is practical and easy.
- Unit is driven through any V-Belt Drive. Torque-arm, fastened to any fixed object, anchors the reducer unit. Turnbuckle provides fast and accurate adjustment of belt tension.
- Backstop available from stock when required. Simple. Positive. Easily installed. Sealed inside the reducer housing.
- Compact, light weight, *rugged.* Quality built by Dodge for Dodge *dependable* service.
- Built in two series—Single and Double Reduction. Capacities from 1 to 27 h. p. Speeds from 12 to 330 rpm. Available from distributors' stocks.
- WRITE for special bulletin A602.

DODGE MANUFACTURING CORPORATION, 2800 Union Street, Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

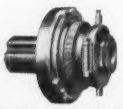
CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new cost-saving methods. Look for his name under "Power Transmission Equipment" in classified phone book.

FIRST IN POWER TRANSMISSION MACHINERY!



V-BELTS AND TAPER-LOCK SHEAVES

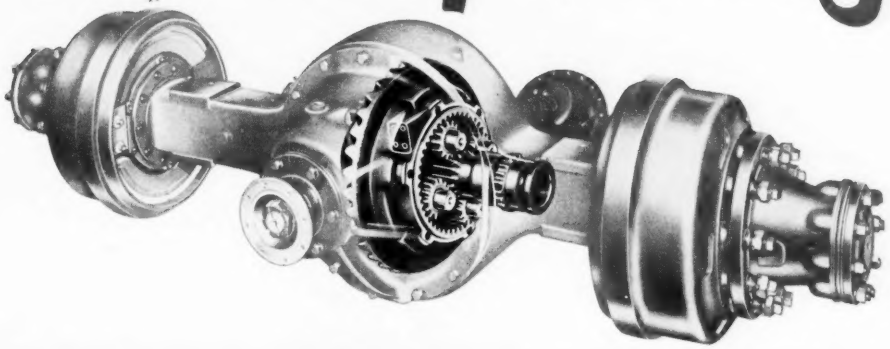
DODGE-TIMKEN PILLOW BLOCKS



ROLLING GRIP AND DIAMOND D CLUTCHES

SOLID STEEL CONVEYOR PULLEYS

Planetary Gearing



saves stress & wear— adds to axle life!

WITH Eaton's planetary construction, gear tooth loads are distributed over four "planet gears," holding stress and wear on any one gear tooth to a minimum. These four gears are completely locked out in the high speed range. In the low speed power range, they rotate at slow speeds. The result is quiet operation; easy, clash-free shifting at all truck speeds; minimum wear; materially longer axle life. The rugged planetary design and forced flow lubricating system—both exclusive Eaton features—enable Eaton 2-Speeds to set unequalled life and performance records. Your truck dealer will explain how Eaton 2-Speeds also reduce stress and wear on the engine and power transmitting parts—how they help your trucks haul more, faster, longer, at lower cost.

Axle Division
EATON MANUFACTURING COMPANY
CLEVELAND, OHIO

EATON
2-Speed Truck
AXLES

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

C.H. Wheeler ENGINEERS help you reduce refrigeration costs

5 to 20% in food processing

Steam Jet Vacuum Refrigeration Unit with Barometric Condensers

They can help you save 5 to 20% over the cost of mechanical refrigeration, if you have live or exhaust steam available, and require moderate chilled water temperatures from 35° to 65°F. Purchase price is lower, because units are standardized in a wide range of sizes. Installation costs less. And – most important of all – long range maintenance cost is lower. There are no moving parts in the system except the chilled water pump.

Employing only water, cooled by flash evaporation, you eliminate hazards of noxious and poisonous refrigerants. In direct cooling of liquid food products, you get the added advantage of deaeration during the cycle of flash evaporation.

Most C. H. Wheeler installations are of a confidential nature. Our engineers will be glad to work with you in applying the correct vacuum equipment for your process.

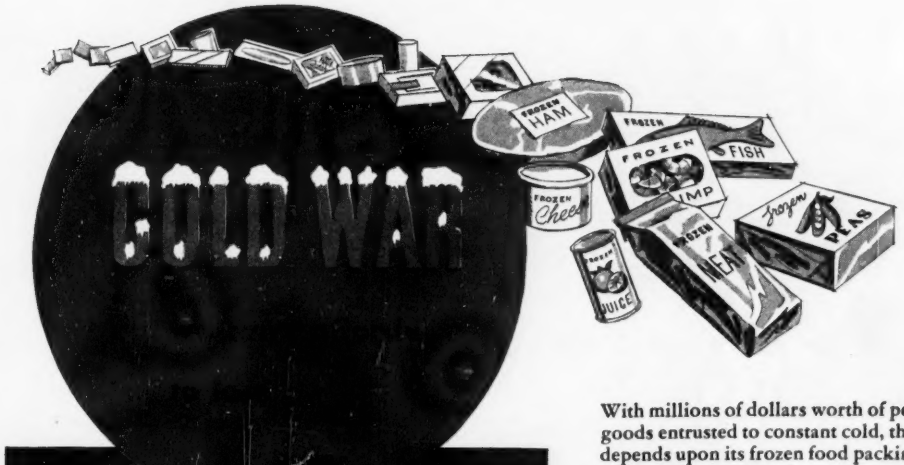
Catalog 1462, yours for the asking, has many suggestions and charts of value to you who have a vacuum or refrigeration problem.

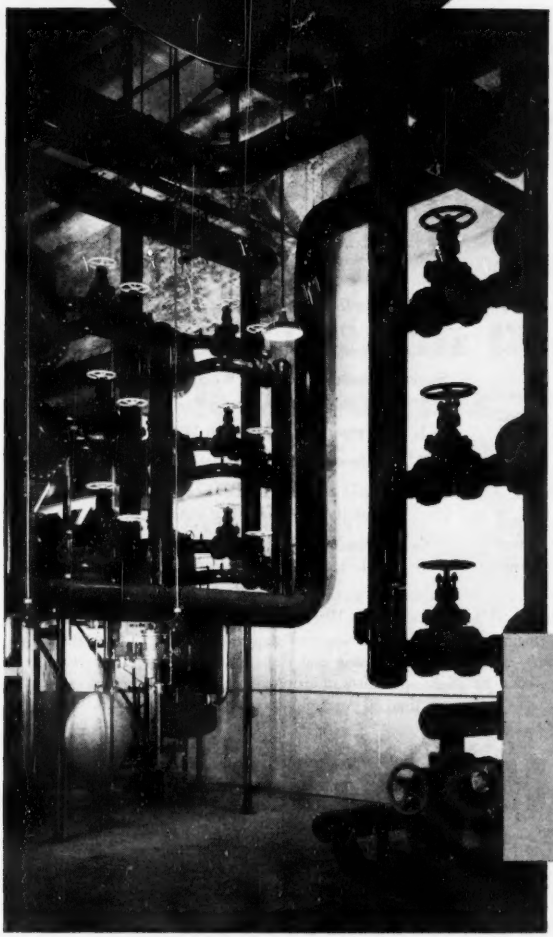
C.H. Wheeler OF PHILADELPHIA

VACUUM REFRIGERATION—COOLING TOWERS—HIGH VACUUM PROCESS EQUIPMENT—MICRO-PARTICLE REDUCTION MILLS—STEAM CONDENSERS—STEAM JET EJECTORS—MARINE CONDENSERS & EJECTORS—DECK MACHINERY

C. H. WHEELER MANUFACTURING CO., 1828 SEDGLEY AVE., PHILADELPHIA 32, PA.

REPRESENTATIVES IN MOST PRINCIPAL CITIES





With millions of dollars worth of perishable goods entrusted to constant cold, the nation depends upon its frozen food packing plants and refrigerated warehouses to conserve precious food supplies. In this "cold war" against waste and spoilage, no mechanical equipment is more vital than valves.

When a valve fails, its removal and replacement often requires shutdown of entire cycles of processing. Subsequent reactivation takes considerable time and frequently involves serious damage to food products. The loss incurred is far greater than the cost of the valve alone.

That's why, in all types of industrial processing as well as food preservation, operating engineers know that the only safe economy is to install the best valves money can buy. Their choice, time after time, of Jenkins Valves is based on long experience. They've learned they can be sure of an extra measure of durability, safety, and efficiency.

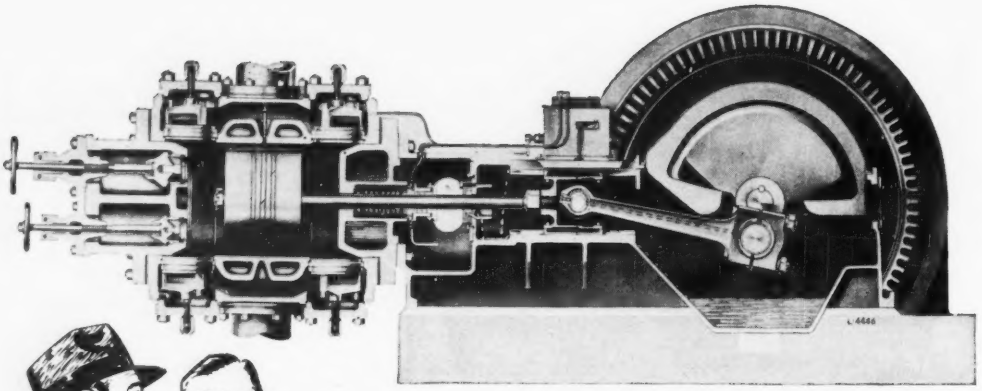
Despite this extra value, *you pay no more* for Jenkins Valves. Let the Jenkins Diamond be your guide to valve economy, for all new installations, for all replacements. Jenkins Bros., 100 Park Ave., New York 17; Jenkins Bros., Ltd., Montreal.

JENKINS
LOOK FOR THE DIAMOND MARK
VALVES
SINCE 1864

Jenkins Bros.

SOLD THROUGH LEADING INDUSTRIAL DISTRIBUTORS

Typical of the thousands of Jenkins Valves serving food plants and refrigerated warehouses throughout the nation, these valves control steam, water, and brine pipe lines in a mammoth 22-acre Texas storage plant.



Cutaway of typical Worthington horizontal compressor which has many advantages for loads over 450 tons.

Why a Horizontal Compressor for the Heavier Refrigeration Loads?

Worthington, unlike other refrigeration compressor manufacturers, makes *all three* types of ammonia compressors—vertical, Y-type, horizontal—to cover the complete range of customer needs.

For the *heavier* loads, Worthington offers a complete range of *horizontal* compressors. Why? What are the advantages of horizontals for heavier loads?

1. More work done. Only the horizontal is double-acting—that is, the piston is working on both strokes.

2. Two stages of compression in one machine. For low-temperature work, the horizontal can have two stages of compression—no second or booster compressor needed.

3. Easier maintenance. All parts of compressor accessible from working floor—no "high altitude" maintenance. Pressure is maintained only in the cylinder—so frame can be opened for maintenance without losing compression or the refrigerant.

4. More flexibility. Horizontals can be installed duplex—that is, two cylinders on different frames operated by the same driver.

Special reasons for using Worthington horizontal compressors include:

1. **wide range of sizes up to 1000 tons**
2. **double-seal housing (optional)**
3. **variable capacity control (optional) of various types, including automatic**
4. **famous Worthington Feather* valves—simplest, most efficient ever made.**

Investigate *more worth with Worthington.* Consult Classified Telephone Directory for nearest Worthington distributor. Worthington Pump and Machinery Corporation, Air Conditioning and Refrigeration Division, Harrison, N. J., specialists in air conditioning and refrigeration for more than 50 years.

*Reg. U. S. Pat. Off.

A.1.39

WORTHINGTON

AIR CONDITIONING AND REFRIGERATION

THE MOST COMPLETE LINE...ALWAYS THE CORRECT RECOMMENDATION

What's YOUR problem?

D. G. Cripps, of Standard Oil's Grand Rapids, Michigan, office, is the Standard Oil lubrication specialist who recommended STANOIL for use in the hydraulic press shown at the left.

Complete familiarity with job requirements and lubrication applications equips a corps of such Standard Oil lubrication specialists throughout the Midwest to handle similar problems for plant operators.

One of these lubrication specialists is near your plant — ready to give you the benefit of his experience and training. You can obtain his services quickly and easily. Just phone or drop a card to the nearest Standard Oil Company (Indiana) office. Ask the lubrication specialist to explain the benefits of such widely accepted lubricants as:

SUPERLA Greases—Available in all consistency grades, SUPERLA Greases cover a wide range of applications. These products are comparable in quality to the highest type of special greases but are as readily available and economical as ordinary cup greases.

CALUMET Viscous Lubricants—On open gears and wire rope, these greases strongly resist washing and throw-off. Their superior wetting ability affords better coating of gears and chains, better internal lubrication of wire rope.

STANORUST Rust Preventives—The eight grades of STANORUST form one of the most complete and effective lines of rust preventives on the market today. Each has been scientifically and specifically developed for its intended use. The grades range from a finger print remover to a heavy petrolatum that protects against corrosion for years under the most severe outdoor exposure.

Gain these benefits for your hydraulic operations

The big 400-ton hydraulic press shown above is used to stamp out parts for farm machinery in a big midwest plant.

When the press was first put into operation, plant operators followed the recommendation of a Standard Oil lubrication specialist and used STANOIL Industrial Oil in the hydraulic system. In over four years of continuous hard service, there has been no lost time because of inefficient performance of the hydraulic oil.

Oil capacity of the system is approximately 9 barrels; only 2 barrels make-up per year has been required. The oil in this system has never been changed. It has been centrifuged once to remove moisture which accumulated over three years' operation. Periodic tests of oil samples have shown that STANOIL has maintained its high lubricating quality. A recent analysis showed no increase in viscosity of the oil, no change in color, and a neutralization number of only 0.13 mg. KOH/gm.

STANOIL
TRADE MARK
Industrial Oil

You can rely on this unique many-purpose oil to give you the same clean, dependable service in your plant's hydraulic systems, speed reducers, head stock gears, auxiliary turbines, compressors, and electric motors. You can rely, too, on the expert, on-the-spot service of a Standard Oil lubrication specialist. How you can obtain his help, quickly and easily, is explained at the right.

Standard Oil Company, 910 So. Michigan, Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA)

STANDARD

2 OF THE BIGGEST REASONS WHY BAKERS SAVE WITH flo-Sweet LIQUID SUGAR!

1

flo-Sweet IS EASIER TO HANDLE!

Now that Flo-Sweet® has solved the problem of controlling the temperature of the batter, bakers can take advantage of the terrific savings in space, congestion and costly manpower that only liquid sugar can give. For years, bottlers and ice cream makers—whose sugar handling problem is far less complex and costly than the baker's—have saved with economical, easy-to-handle liquid sugar. It's ten times as important to you!—A Flo-Sweet liquid sugar installation delivers sugar to every mixing bowl at the turn of a tap . . . makes accurate measuring and mixing easy as pie—gives you 100% product perfection from every batch!

2

flo-Sweet IS TAILORED TO YOUR NEEDS!

Flo-Sweet provides the percent of invert you ask for at regular sucrose prices—saves important time and labor costs. No need to buy invert in drums. No messy invert mixing job. Thus, Flo-Sweet simplifies big plant usage of sugar in general and invert in particular . . . makes it possible for smaller plants to use invert on an economical basis. Just tell us how much invert you need and you'll get it ready-mixed in your Flo-Sweet *at no extra cost*, and absolutely free of the waste and mess of single-batch mixing!

NOTE: *If you want the savings, service, and product improvement enjoyed by the profit-minded bakers who use Flo-Sweet Liquid Sugar, write us for details today.*

flo-Sweet

Manufactured only by

REFINED SYRUPS & SUGARS, INC.

Yonkers 1, New York

PIONEERS IN LIQUID SUGAR FOR SAVINGS, SANITATION AND SERVICE

New *Carpenter* Slide Chart contains useful data on STAINLESS TUBING and PIPE

DESIRABLE BENDING and COILING RADII for
Carpenter STAINLESS TUBING and PIPE
STANDARD DIMENSIONS for STAINLESS PIPE
STANDARD SIZES Carpenter ROUND STAINLESS TUBING
THE CARPENTER STEEL COMPANY
ALLOY TUBE DIVISION • UNION, NEW JERSEY

To help you conserve Stainless and get best results from the tubing and pipe you use, Carpenter has prepared this handy slide chart. It contains data on economical tube bending radii and coil diameters for light-walled Schedule 5 pipe.

This Carpenter Slide Chart gives you—

Bending radii for Stainless Tubing (with and without mandrels)

Coil diameters for Stainless Pipe (Schedules 5, 10 and 40)

Technical data on
- Tensile Strength
- Rockwell Hardness
- Heat Resistance
- Thermal Conductivity, etc.

How to Get Your Copy of the New Carpenter Stainless Tubing Slide Chart

Just drop us a note on your company letterhead, and we will be glad to send you a copy of this useful slide chart. You can use it to conserve critical material by getting best possible results where you use Stainless Tubing or Pipe.

THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, N. J.
Export Department, Reading, Pa. "CARSTEELCO"

Carpenter
STAINLESS TUBING

—guaranteed on every shipment

SETS BAKE TIME EASILY WITH G-E ADJUSTABLE SPEED DRIVE

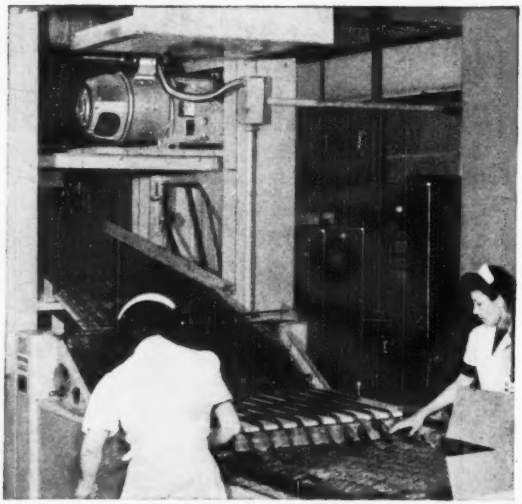
At Farm Crest Bakeries, finger-tip control simplifies continuous baking

Ultra modern from one end to the other, the new Columbus, Ohio plant of Farm Crest Bakeries, Inc. is noted for its high speed, high output baked goods line. G.E.'s highly accurate, adjustable-speed Thy-mo-trol* gear-motor drive is used to operate each of the eight sections of this line.

At his remote control station, the Farm Crest baker can accurately adjust speed through a baking time range of 3½ to 14 minutes. Thus, many types of baked goods may be handled without difficulty.

To Farm Crest, G-E adjustable-speed drive means the utmost in flexibility, minimizing the nuisance of bulky mechanical speed changers. The installation is completely clean; doesn't require heavy oiling which can be the source of much dirt accumulation.

G-E adjustable-speed drives are constantly bringing greater flexibility to manufacturers in every field. To you they may mean increased production with improved quality control, savings of scarce materials, cutting of rejects, and an increase in the versatility of your existing machinery. Send the coupon below for complete details. *General Electric Co., Schenectady 5, N. Y.*



Removing finished cookies from the stacker. G-E Thy-mo-trol panels on wall provide precise speed control and adjustment of G-E gear-motor drive to give Farm Crest Bakeries the utmost in baking flexibility.

WHICH DRIVES ARE BEST FOR YOU?

This 26-page manual will help you decide. It shows you how to go about selecting the *right* drive. The handy drive chart included is worth your detailed study. Bulletin GEA-5334. Check here. . . . . ☐

General Electric Company, Section B646-11
Apparatus Department, Schenectady 5, N. Y.

Please send me the bulletins checked:
☐ for reference only
☐ for planning an immediate project

NAME _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____

THE ACA MOTOR—*Speed ranges to 20:1*—An adjustable-speed a-c motor. Speed range 3:1 or 4:1 continuous; for intermittent operation from 6:1 to 20:1. Bulletin GEA-4883. Check here. . . . . ☐

THE SPEED VARIATOR—*Speed ranges to 40:1*—An adjustable-voltage d-c drive that uses a-c power. Speed ranges 8:1 to 40:1 and beyond. Bulletin GEA-5335. Check here. . . . . ☐

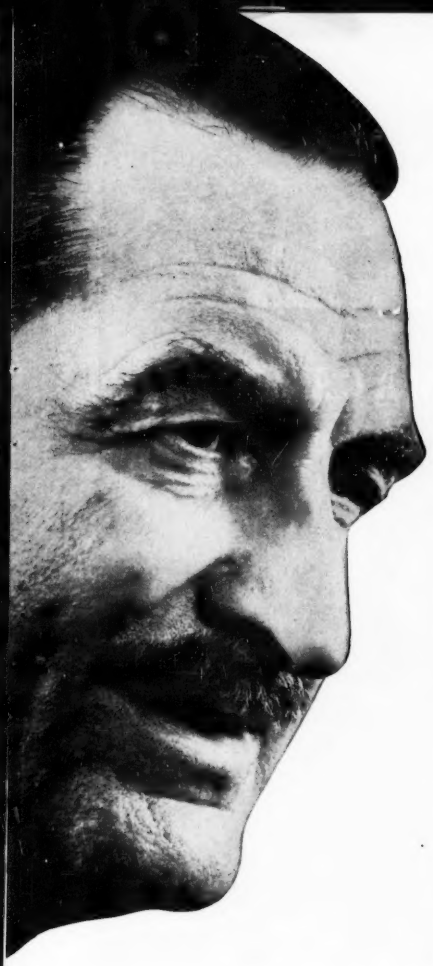
THY-MO-TROL*—*Speed ranges to 100:1*—The most accurate, most versatile, and fastest acting of all G-E adjustable-speed drives. Speed ranges of 100:1 or better. Bulletin GEA-5337. Check here. . . . . ☐

ELECTRONIC SPEED VARIATOR—An electronically controlled version of the Speed Variator that offers most of the features of Thy-mo-trol for applications in the 15 to 60-hp range at moderate cost. Bulletin GEA-5336. Check here. . . . . ☐

** Thy-mo-trol is the General Electric Company's registered trademark for its electronic motor-control system.*

Headquarters for ELECTRICAL ADJUSTABLE-SPEED DRIVES

GENERAL ELECTRIC



Vitamin A

enriches both your products and your profits

LIKE many others, you may find that a fine way to touch off a boom in your sales is to put on your label the words: "Enriched with Vitamin A."

DPi's concentrate, unexcelled among natural materials for freedom from taste and odor, may be just the "something extra" you need to put an upward slant in that sales curve.

Or you may find that Myvax 16 Synthetic Vitamin A Palmitate is the answer for your particular product.

Natural *or* synthetic—you get the world's finest vitamin A from DPi. Working it into your plant processes is not at all complicated, and the price is lower now than it has been in years. Let's arrange a date at one of our sales offices and go into the details thoroughly. ***Distillation Products Industries,*** 723 Ridge Road West, Rochester 3, N. Y. (Division of Eastman Kodak Company). Sales offices: 570 Lexington Avenue, New York 22, N. Y. • 919 North Michigan Avenue, Chicago 11, Ill.

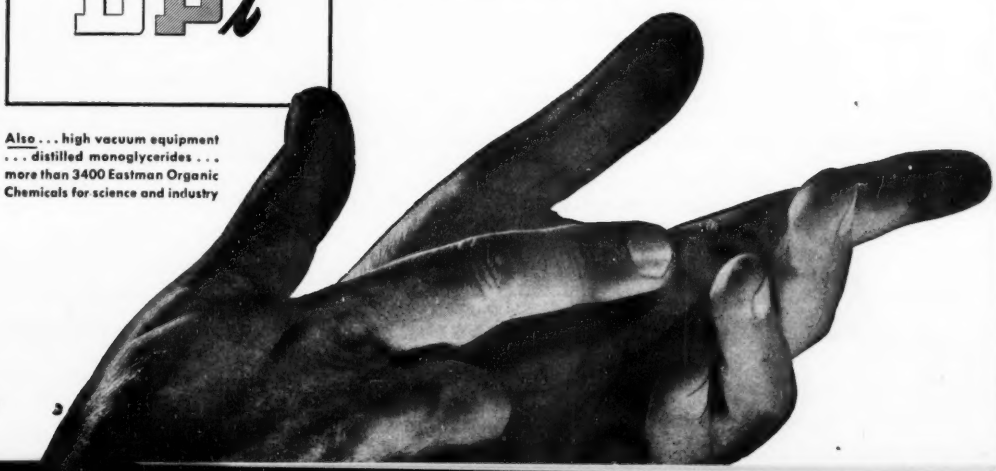
- W. M. Gillies and Company, Los Angeles and San Francisco
- Charles Albert Smith Ltd., Montreal and Toronto.

"Myvax" is a trade-mark

DPi

leaders in research and production of both natural and synthetic vitamin A

Also . . . high vacuum equipment . . . distilled monoglycerides . . . more than 3400 Eastman Organic Chemicals for science and industry



Yankee Doodle went to town,
Riding on a pony,
Stuck a feather in his cap,
And called it macaroni!

in Pne

It most certainly is, when you realize how many of America's foremost producers of macaroni and egg noodles are Pneumatic customers!

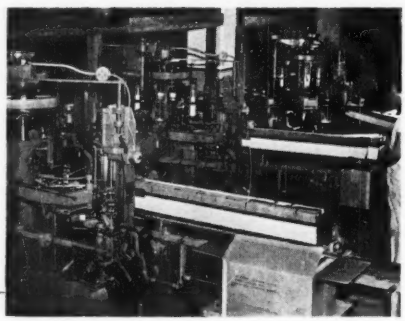
Like C. F. Mueller Co., makers of Mueller's Macaroni, most of these famous manufacturers are long-time users of Pneumatic packaging machines. Long enough to test them . . thoroughly . . and to convince themselves that nothing can quite match the operating efficiency and economy of Pneumatic equipment.

The whys and wherefores of Pneumatic's "lower cost per container" performance will interest any one considering the purchase of packaging equipment. When that time comes for you . . . get *all* the facts, from Pneumatic.

PNEUMATIC SCALE CORP., LTD., 91 Newport Avenue, Quincy 71, Massachusetts. *Also: New York; Chicago; San Francisco; Los Angeles; Seattle; Leeds, England.*

FAMOUS MACARONIS PACKAGED ON PNEUMATIC MACHINES

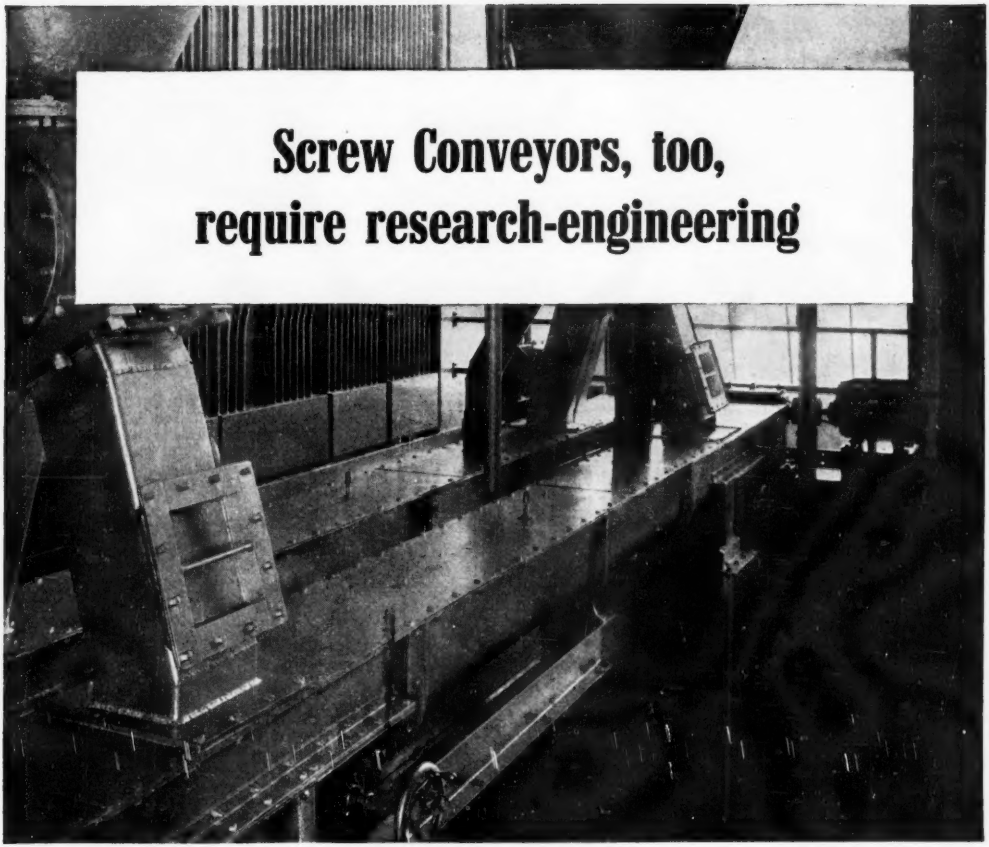
PRINCE	BAY STATE	KEYSTONE	RONZONI
CREAMETTES	KRAFT DINNER	CONTE LUNA	CATELLI
LA ROSA	PROCINO-ROSSI	PARAMOUNT	BRAVO
GIOIA	RAVARINO-FRESCHI	DELMONICO	VIMCO



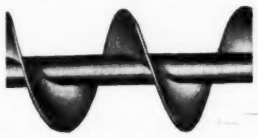
Pneumatic carton feeding and bottom sealing equipment in operation at C. F. Mueller plant in Jersey City, N. J.

PNEUMATIC **PACKAGING AND BOTTLING MACHINERY**

Screw Conveyors, too, require research-engineering



Link-Belt screw conveyors have a multitude of applications in handling bulk materials. Here pulverized fuel is fed to boilers. Entire system is dust-tight.



Helicoid or Sectional Conveyor Screws —for general screw conveyor applications; may also be furnished in the metal and finish best suited to your purpose and with components selected from the most complete line.

We want to sell Screw Conveyors. But more important, we want you to get the most out of them!

As THE leading producer of conveying and elevating equipment, Link-Belt has developed many screw conveyors for specialized applications. That's why we offer you the widest range of types . . . in any suitable metal to meet requirements like high temperature, corrosion, sanitation, abrasion . . . in a full range of diameters, gauges, pitches.

Link-Belt Screw Conveyors are simple and compact . . . have few wearing parts. More . . . they are accurately made to insure easy assembly, smooth and continuous operation.

And here's another plus — Link-Belt can supply all of the components such as conveyor screws, collars, couplings, hangers, troughs, trough ends, flanges, thrusts, drives. Call your nearest Link-Belt office for complete information.

LINK-BELT

SCREW CONVEYORS

LINK-BELT COMPANY: Chicago 8, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa). Offices in principal cities. 12,342

"ZEPHYRWELD"® WELDING FITTINGS . . . SS Type 304-347-316—Inconel and other SS analyses. Fabricated in O.D. Pipe and Tube Size, ½ in. thru 24 in.—ells, tees, adapters, etc. Covered in Catalog 748.

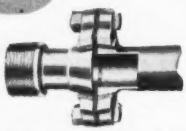
RECESSED-END FITTINGS . . . Stainless Type 304-347-316. Low cost, light weight fittings for fast, simple soldering, brazing or socket welding. Sizes from ½ in. thru 24 in. Full line of elbows, tees, adapters, etc. Covered in Catalog 948.

Try

TRI-CLOVER

CLAMP-TYPE CONICAL FITTINGS . . . requires only 1 simple ferrule, assures leak-tight joints thru sanitary Teflon gaskets. Fast, simple assembly and disassembly. Full line in sizes from 1 in. thru 4 in.

SANITARY TYPE FITTINGS . . . Stainless Steel and Tri-Alloy (Nickel Alloy), from 1 in. thru 4 in. O.D., full range of fitting types. Approved as meeting 3A Standards throughout, incorporating exclusive design features. Covered in Catalog 150-B.



CONICAL END FITTINGS . . . Stainless Type 316—Inconel and other SS analyses. Complete line, sizes from 1 in. thru 4 in. O.D. Features: Light weight—low cost—fast installation—leak tight—easily adapted to other fitting types. Covered in Catalog 848.

. . . for the COMPLETE LINE* of LOW-COST CORROSION-RESISTANT PIPING . . . in both Tube O.D. and Pipe O.D. types

Here you see five representative fitting types that go to make up the complete Tri-Clover line—all available from one source. Install these stainless steel or alloy products in your process lines and realize the advantages of increased production and lower maintenance cost. 32 years of specialized experience in solving corrosion piping problems can be yours by consulting our engineers.

Write for details, or see your nearest Jobber.

Tri-Clover®
MACHINE CO.
Kenosha, Wisconsin

TRIALLOY AND STAINLESS STEEL SANITARY FITTINGS, VALVES, PUMPS, TUBING, SPECIALTIES

FABRICATED STAINLESS STEEL INDUSTRIAL FITTINGS AND INDUSTRIAL PUMPS

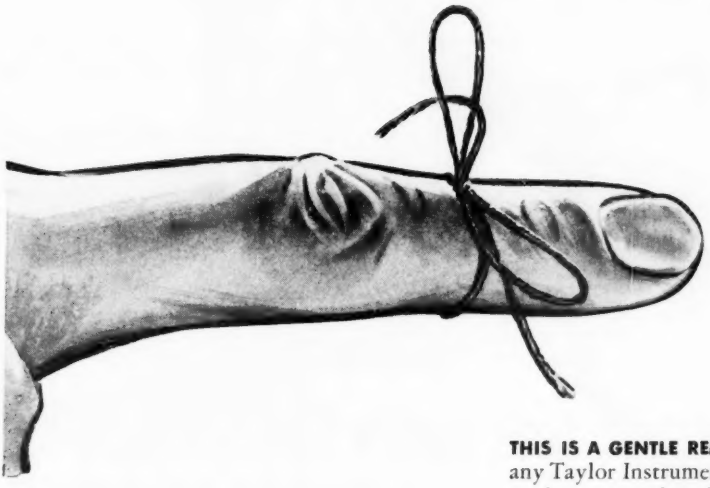
THE Complete LINE

*ALL FROM 1 SOURCE

The COMPLETE Tri-Clover Line Includes:

- Flared Tube Fittings (Koncentrik)
- Tube O.D. Buttweld Fittings (Zephyrweld)
- I.P.S. O.D. Sch. 5 and 10 Buttweld Fittings (Zephyrweld)
- I.P.S. O.D. Sch. 40 and 80 Buttweld Fittings
- Flanged Conical End Fittings (Tube O.D.)—1" Through 4"
- Industrial Recessed End Fittings (Tube O.D.) 1" Through 10"
- Screwed and Flanged Valves (Powell)
- Special Fabricating Facilities
- 3A Standard Sanitary Fittings and Valves (Stainless Steel and Tri-Alloy)
- All-Sanitary Magnetic Full-Flow Traps
- Centrifugal Pumps—Sanitary and Industrial
- Stainless Steel Tubing and Pipe—All Sizes and Analyses

(Inventories carried in distributors' stocks strategically located throughout the United States.)



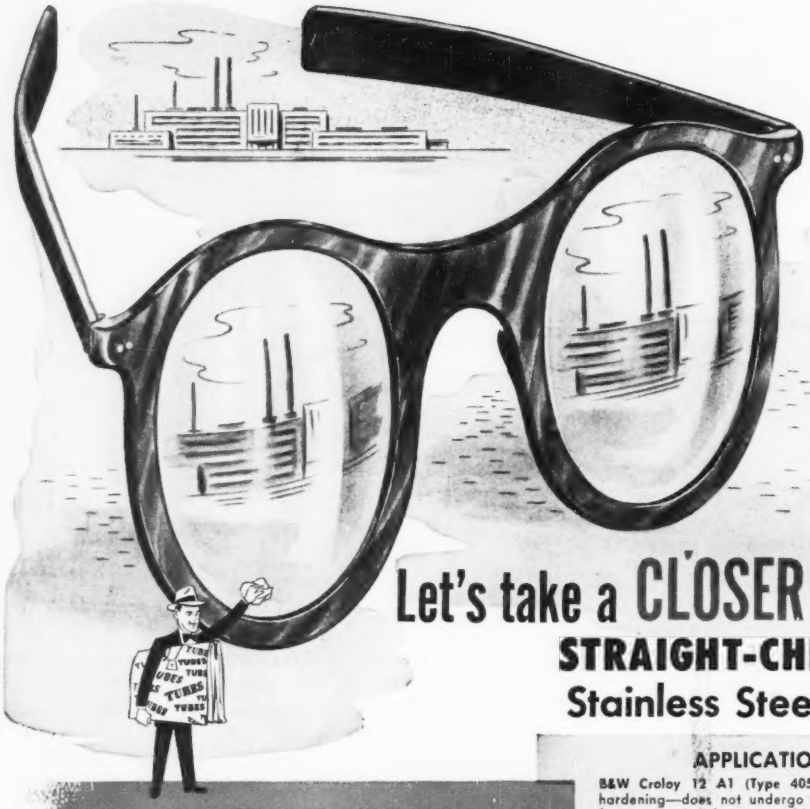
THIS IS A GENTLE REMINDER to send back *now* any Taylor Instruments that need repairs. Give us time to put them back in first class condition and get them back to you early, so you can have them installed and ready when next season's pack begins with a rush. **Warning**—Only the manufacturer of an instrument—regardless of make—should be entrusted with its repair to insure first class performance.

PLANNING TO BUY NEW instruments for the coming season? Better get your orders in soon, too. Defense orders and material shortages could affect our deliveries next year.

NOTE: Taylor Factory Repair Service now available at Rochester, San Francisco, Tulsa and Toronto. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY



Let's take a CLOSER LOOK at STRAIGHT-CHROMIUM Stainless Steel Tubing

Present restrictions on nickel have cut production of austenitic stainless steel tubing far below demand. If this critical shortage of nickel-bearing stainless tubing is compelling you to find other suitable grades, you should take a closer look at the straight-chromium analyses.

Readily available in quantity from B&W are pipe and tubes of the four non-nickel-bearing types listed at the right with typical uses. These ferritic and martensitic steels are magnetic at ordinary temperatures after all conditions of heat treatment, have relatively high oxidation resistance at elevated temperatures, and resist attack by many corrosive media. With certain modifications in procedures, they can be satisfactorily fabricated by all methods applicable to austenitic grades.

For both pressure and mechanical applications, tubes of straight-chromium stainless analyses are worthy alternates for hard-to-get nickel-bearing stainless types. Would you like a copy of TDC-140 containing technical data on these easy-to-get grades of stainless tubes? Ask Mr. Tubes—your B&W Tube Representative—about their suitability for your applications.

APPLICATIONS

B&W Croloy 12 A1 (Type 405, Seamless)—Non-hardening—does not undergo appreciable transformation; therefore no sudden volume change occurs during heating—corrosion and oxidation resistant. Typical uses: Conveyor lines in oil refining and chemical processing, heat exchanger tubing, boiler tubing in mercury heat cycle, catalytic oil cracking processes where fins have been welded to tubes.

B&W Croloy 12 (Type 410, Seamless and Welded)—Hardenable—moderate corrosion and heat resistance. Typical uses: Machinery in the chemical and food processing and packaging fields.

B&W Croloy 18 (Type 430, Seamless and Welded)—Sufficient ductility for forming simple parts—good corrosion and oxidation resistance—can be polished or buffed to pleasing finish. Typical uses: Conveyor lines in chemical processing field; condensers and piping in production, transportation, and storage of nitric acid and in nitrating operations involving mixed acids; furnace parts; retorts; ornamental structures.

B&W Croloy 27 (Type 446, Seamless)—Corrosion resistant—excellent heat resisting qualities. Typical uses: Furnace parts, heat interchangers, kilns, pyrometer protection tubes, soot blower elements, dehydrogenation equipment in chemical and oil refining fields. Also well suited for glass sealing applications.

THE BABCOCK & WILCOX TUBE COMPANY

Executive Offices: Beaver Falls, Pa.

General Offices & Plants

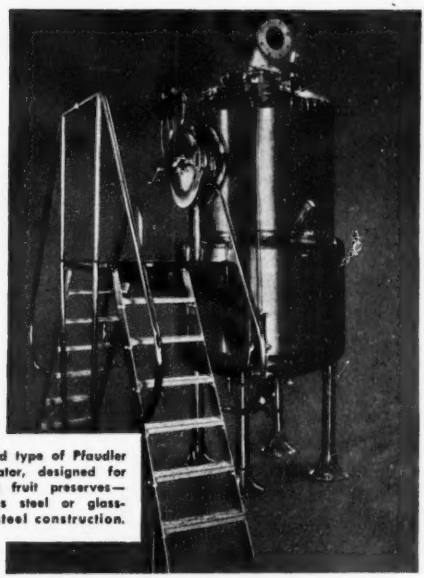
Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
Alliance, Ohio—Welded Carbon Steel Tubing

Sales Offices: Beaver Falls, Pa. • Boston 16, Mass. • Chicago 3, Ill. Cleveland 14, Ohio • Denver 1, Colo. • Detroit 26, Mich. • Houston 2, Texas • Los Angeles 17, Calif. • New York 16, N. Y. • Philadelphia 2, Pa. • St. Louis 1, Mo. • San Francisco 3, Calif. • Syracuse 2, N. Y. Toronto, Ontario • Tulsa 3, Okla.

B&W STAINLESS and WELDED TUBES

TA-1651S

Are you boiling away the SALES APPEAL of YOUR PRODUCT?



Jacketed type of Pfaudler Evaporator, designed for making fruit preserves—stainless steel or glass-lined steel construction.

Vertical tube type Pfaudler Evaporator for concentrating large volumes of juices, syrups, milk, etc.

Open kettle boiling of fruits and juices sure can wreck their sales appeal in a hurry. It ruins all natural characteristics. It may even cost you more to process. Most important, it makes it tough to sell the final product. So why do it the hard way?

Besides processing at a lower boiling point, Pfaudler Vacuum Process Equipment enables you to accurately control the operation from start to finish. This uniform control helps you to stabilize natural flavor, color and bulk of fruit products; it helps you maintain the natural color and taste of juices, jellies, jams, syrups and flavorings. You eliminate carmelization. Most important, you enhance sales appeal by controlling all aspects of the processing cycle.

In many cases, you can reduce the cost of operation—since less labor is required. In one instance a preserver reduced manpower 50% while producing 80% more volume. This is important for two reasons—you reduce manpower requirements and overall processing cost.

Whether your process requires a jacketed vacuum cooker or large vertical tube heat exchanger evaporators, Pfaudler has the know-how to completely engineer your plant. It assumes the responsibility for achieving desired results. Let us help you with your problems. Use coupon below.

Pfaudler Vacuum Process Equipment Preserves the Sales Appeal of Your Product

Pfaudler

THE PFAUDLER CO., ROCHESTER 3, NEW YORK
Engineers and Fabricators of Food Processing Equipment

Gravity Fillers · Piston Fillers · Steam Peelers · Deaerators · Vacuum Pans · Evaporators

THE PFAUDLER CO.
Dept. FE-12 Rochester 3, N. Y.

We are interested in Pfaudler Vacuum Evaporators for processing .....

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Address .....

Company .....

City ..... State .....

"Whatever Your Conveyor Belting Problem . . . *Thermoid Has The Answer*"

Perhaps your problem is handling packages on an incline of 25—even 35—degrees. You'll find the solution in Thermoid "Ruff-Top" Conveyor Belting—with its thousands of small, rough, irregular-shaped points of soft rubber that take a firm grip on the lightest packages or cartons.

But whatever the job—whatever the nature of materials to be handled—heavy or light, soft or abrasive, hot or cold, wet or dry, uniform or non-uniform in size—consult your Thermoid distributor. He can recommend the right type of Thermoid Belt to do the job at the lowest cost per ton of material moved.

Thermoid's extra margin of endurance means fewer delays due to belt breakage or premature wear.

Here's The Book That Will Answer Many Of Your Questions

Drop us a line for your free copy of Book No. 3679. It is a handy reference guide, concise and complete. 16 pages of valuable charts, tables and graphs tell how to select the right conveyor or elevator belt for the materials to be handled . . . how to determine capacities, speeds, weights and number of plies.

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

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Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

5-letter word for lower delivery costs...

M **More payload.** America's most popular multi-stop delivery trucks give about twice the payload space of panels. You get more payload space for peak-load periods.

E **Easier deliveries.** Every International with Metro body offers wide doors at front and rear, a low floor, and extra ceiling room to save driver time and work.

T **Truck construction.** An International with Metro body is *all* truck. Its chassis cuts operating and maintenance costs. You get a lasting-quality Metro body.

R **Right size.** Choose exactly the right model for your job from 6 models, 4 body sizes. GVW's—5,400 to 11,000 pounds; payload capacities—235 to 375 cubic feet.

O* **Overwhelming acceptance.** New Internationals with Metro bodies are better than models that held first place in multi-stop field 12 straight years. See 'em now.

*Metro. Registered trade mark of The Metropolitan Body Company, Inc., subsidiary of the International Harvester Company.

International Harvester Builds McCormick Farm Equipment and Farmall Tractors... Motor Trucks... Industrial Power... Refrigerators and Freezers

INTERNATIONAL HARVESTER COMPANY • CHICAGO

Internationals with Metro bodies for multi-stop deliveries offer super-specialization to fit your business, keep costs down. Available in 7¾, 9½, 10½ and 12-foot body sizes, body capacities from 235 to 375 cubic feet, GVW's from 5,400 to 11,000 lbs.

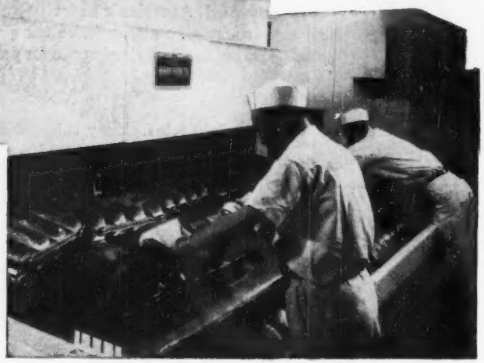
INTERNATIONAL TRUCKS

"Standard of the Highway"

Quality in Quantity

● *Gas-fired Baker Perkins oven bakes 7,200 loaves of bread per hour at Omar Incorporated, Columbus, Ohio.*

● *720 dozen doughnuts an hour are formed, proofed, fried, glazed and cooled in this Gas-fired machine, manufactured by the Doughnut Corporation of America, New York.*



- **BREAD AND ROLLS**
- **PIES**
- **DOUGHNUTS**
- **CAKES**

from GAS Baking Equipment at Omar Incorporated

QUALITY in QUANTITY GAS BAKING is typical of the Columbus, Ohio, bakery of Omar Incorporated, Omaha, Nebraska. The continuous, automatic production-line methods of Omar highlight the versatility and effectiveness of GAS baking for speed and quality.

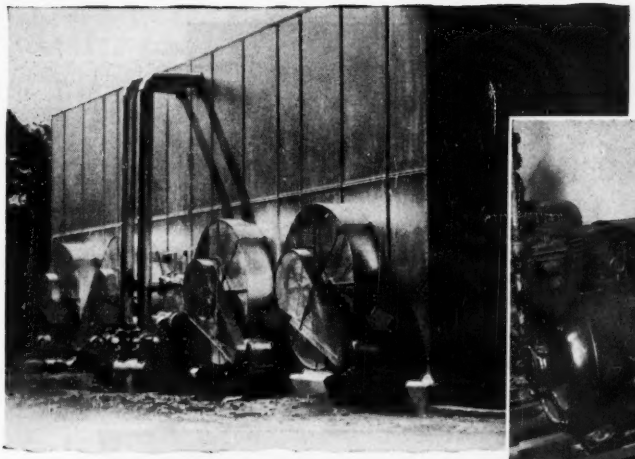
Modern Gas Baking and Frying Equipment helps produce

- **7,200 loaves of bread per hour**
- **720 dozen doughnuts per hour**
- **500 eight inch pies per hour**
- **2,340 layer cakes and 10,000 cupcakes per hour**
- **plus large quantities of sweet and plain rolls.**

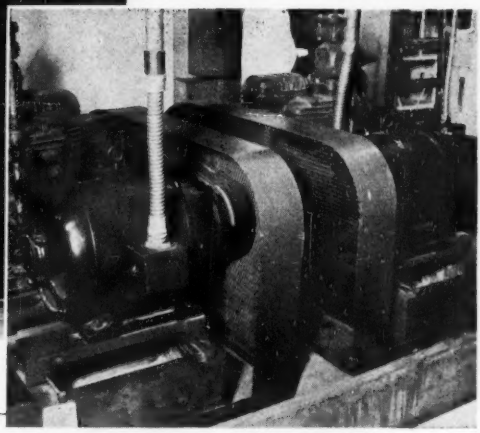
Baking temperatures obtained with GAS are precise and easily controlled. Gas is clean, economical, and completely adaptable to all baking requirements.

Whether your baking volume is large or small, Gas baking gives the speed and precise temperature control needed to make your bakery goods the best possible, as at Omar. Get the facts today from your Gas Company Representative.

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK 17, N. Y.



Four Century 5 horsepower splash proof motors driving fans.



Two Century 30 horsepower motors driving refrigeration compressors.

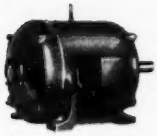
Century

TYPE SC-
SQUIRREL CAGE MOTORS

⅛ to ¾ horsepower

1 to 1½ horsepower

2 to 15 horsepower



20 to 125 horsepower

150 to 400 horsepower

Equipment Producers Select Century Motors

To Give You Long-Life Performance With Least Down-Time

The correct selection of the right combination of motor type, speed, power, torque, frame and mounting keeps Century motors on the job.

Team work between your motorized equipment producers and Century motor engineers means that you always get the right motor—selected from Century's wide range of types and kinds, in sizes from ⅛ to 400 horsepower for single or polyphase alternating current and direct current. You can be confident that you get top performance from the fine equipment these motors drive.

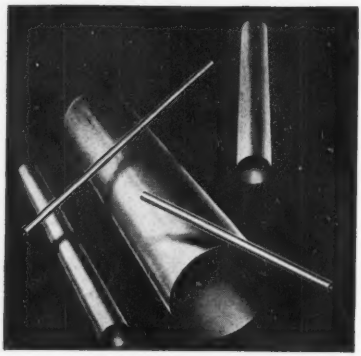
Skillful application makes sure that Century motors meet the exacting requirements of the machines they drive. That's your assurance of dependability.

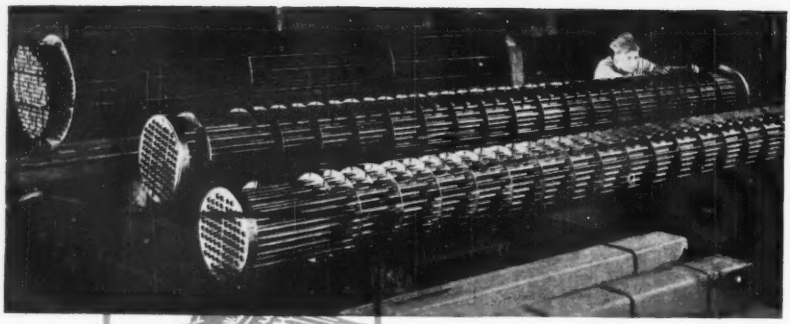
CENTURY ELECTRIC CO. 1806 Pine St., St. Louis 3, Mo.
Offices and Stock Points in Principal Cities

Century Electric Company is celebrating its 50th year in the electrical industry.

CE-890R

Specify Century C MOTORS for all your electric power requirements





A. O. SMITH designs with TRENTWELD

When A. O. Smith, big name in steam and heat transfer equipment recently designed and built a heat exchanger unit for Socony-Vacuum — TRENTWELD Stainless Steel tubing was used throughout. This heat exchanger unit for use in the petroleum industry is another example of how TRENTWELD is preferred by designers for products where stainless steel tubing fits the bill.

And here's why: TRENTWELD is the product of tube specialists. That means you're assured uniform quality and specifications of manufacture that meet your most exacting needs. Then too, TRENTWELD is available in a full range of sizes—⅛" to 36" in diameter, in all grades and finishes. When the job requires stainless steel tubing, check with us.

TRENTWELD

STAINLESS STEEL TUBING

TRENT TUBE COMPANY, GENERAL SALES OFFICES, EAST TROY, WISCONSIN

(Subsidiary of Crucible Steel Company of America)

CHARLES BOWMAN & CO.

ANNOUNCES

a sensationally new line of food and pharmaceutical yeast

BOWMAN FOOD YEAST

(Torulopsis utilis)

**Approved Label Statement*

***This *product* equals or exceeds *all* quality standards for yeast as specified in the U. S. P. XIV for Saccharomyces cerevisiae.**

Type	Thiamine	Riboflavin	Niacin
B	150	50	500
50	150	100	1000
90	270	100	1000
200	600	100	1000

Bowman Food Yeast is guaranteed to equal other food and pharmaceutical yeasts in nutritional value when used as a supplement in *practical* diets.

Available in all standard ranges of B Complex potencies.

Look at these distinct advantages

1. **Taste:** Has none of the objectionable taste characteristics of other nutritional yeasts, primary grown or brewers by-product. Can be eaten like a breakfast cereal.
2. **Stability:** Samples stored 36 months under normal storage conditions show no rancidity.
3. **Purity:** This yeast is produced from bacteria-free materials under conditions which insure a super-pure product.
4. **Uniformity:** Quality variations are negligible because it is primary grown.
5. **Complete:** Total protein, amino acids, minerals and B-complex factors compare favorably with other nutritional yeasts.
6. **Extra Values:** Extremely low sodium content (0.02% or less). High folic and folinic acid content plus B_{12} activity.
7. **Economy:** This yeast is priced below other nutritional yeasts offered to the food and pharmaceutical industries.

LAKES STATES YEAST CORP., Rhinelander, Wisconsin, is the sole manufacturer and CHARLES BOWMAN & CO. is the exclusive selling agent.

To our old customers, we offer a superior product at a saving. We invite new customers to try our product.

CHARLES BOWMAN & CO.

220 East 42nd Street, New York 17, N. Y.

Pacific Coast Representative: W. Glenn Wunderly, Pasadena, California

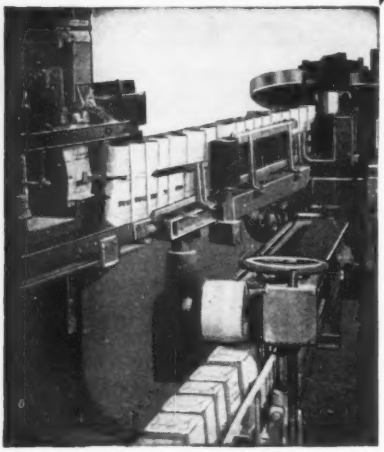
Mid-Western Representative: Kenneth L. Cartwright, St. Louis, Missouri

Vitamin D, Antibiotics, Chlorophyll, Xanthophyll, Carotene, A & D Powders, Yeast Extracts.

THE BEMIS DELTASEAL BAG *PLUS* DELTASEAL PACKAGING EQUIPMENT

Equals

The most Economical, Efficient Package for Your Product



- Deltaseal® filling and closing is fast... mostly automatic... less handling.
- Deltaseal Bags have a neat, square, full-pack appearance... build easily into eye-catching displays.
- Crisp, brilliant Bemis printing on Deltaseals headlines your brand.
- Consumers like Deltaseal's exclusive Pull-Cut-Pour Spout.
- Bemis Packaging Specialists help you get the smoothest, most economical service from your Deltaseal System.

Ask the Bemis man for the complete Deltaseal story

"America's No. 1 Bag Maker"

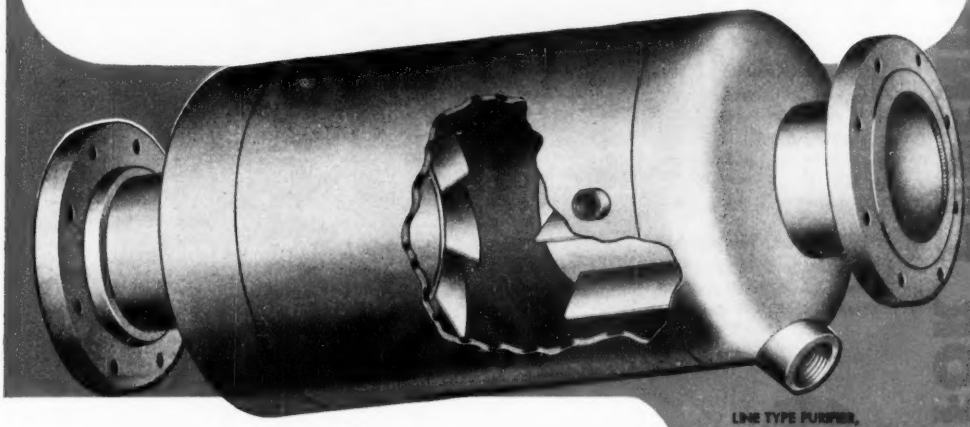
Baltimore • Boise • Boston • Brooklyn • Buffalo • Charlotte • Chicago • Cleveland • Denver Detroit • East Pepperell • Houston • Indianapolis • Jacksonville, Fla. • Kansas City Los Angeles • Louisville • Memphis • Minneapolis • Mobile • New Orleans • New York City Norfolk • Oklahoma City • Omaha • Peoria • Phoenix • Pittsburgh • St. Louis • Salina Salt Lake City • San Francisco • Seattle • Vancouver, Wash. • Wichita • Wilmington, Calif.

Bemis

BEMIS BRO BAG COMPANY

Save Money with - - - -

Anderson Hi-eF Line Type Purifiers



LINE TYPE PURIFIER, flanged connections, Bulletin #200

LOW COST UNITS REMOVE 100% ENTRAINMENT

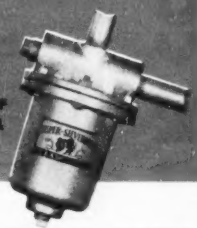
You can *substantially* reduce your cost for separating equipment by specifying Anderson Hi-eF Line Type Purifiers. Now, for the first time, you can purchase high efficiency purifiers for the price of an ordinary separator! This fact is made possible by new, efficient production methods plus a new improved purifier design perfected by Anderson engineers with over 27 years experience in the development and special application of high efficiency purifiers. Despite the economy of first cost, Line Type Hi-eF Purifiers are unsurpassed by any similar unit—remove virtually 100% entrainment from gases and vapors.

Anderson Line Type Hi-eF Purifiers pay rich dividends by removing entrained liquids, solids, condensates, oil or grease from live or exhaust steam, from processed gas, air, or chemical vapors.

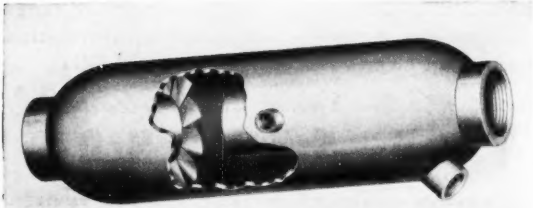
Self cleaning, they have no moving parts or baffles . . . need no attention or periodic servicing. Good design permits extremely low pressure drop.

Save money. Specify low-cost Anderson Hi-eF Purifiers. Anderson manufactures all types in all sizes to any specifications. Mail coupon today for prices and bulletins.

ANDERSON Hi-eF PURIFIERS



MADE BY THE MAKERS OF SUPER-SILVERTOP STEAM TRAPS AND STRAINERS



LINE TYPE PURIFIER, screwed connections, Bulletin #500

PURIFIER DIVISION,
THE V. D. ANDERSON COMPANY
1995 West 96th Street • Cleveland 2, Ohio

Gentlemen: Please send additional information on Anderson Hi-eF Purifiers described in:

☐ Bulletin #200 ☐ Bulletin #500

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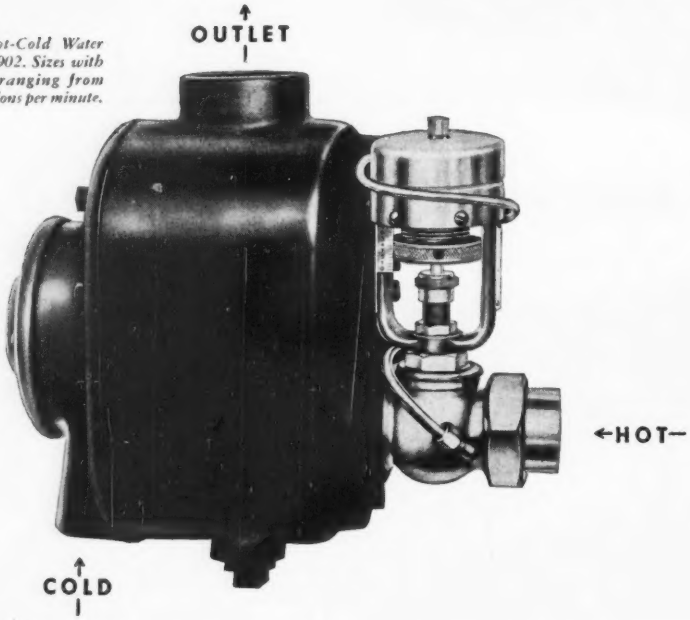
Company_____

Address_____

City_____ Zone____ State_____

SYLPHON CONTROLS FOR DEPENDABILITY

Sylphon Hot-Cold Water Mixer No. 902. Sizes with capacities ranging from 5 to 131 gallons per minute.



SPECIAL DELIVERY SYSTEM FOR *Constantly* HOT WATER!

Used in
Factories
Office Buildings
Apartment Houses
Hospitals
Schools
Hotels, etc.

for
Gang showers
Needle showers
Continuous baths
Wash fountains
Process water for packing houses, bakeries, dairies, garages, other industries

If you require constant temperature hot water for processing, showers and other operations—see what this thrifty, easily-installed Sylphon Hot-Cold Water Mixer can do to help you.

It uses hot water from any storage tank or instantaneous heater. It regulates the amount of cold water required to temper it to the desired degree. Water is actually mixed together before delivery. Temperature remains constant—even if supply water temperature or pressure fluctuates. Everything works automatically—dependably!

Here's an extra advantage. If either hot or cold water supply fails, the Sylphon Mixer immediately shuts off the remaining supply. When supply is returned, the Mixer starts operating again.

Sylphon Hot-Cold Water Mixers are self-contained, self-powered, ruggedly built. Adjustable temperature range. For complete information, write Department GG.

Temperature Controls • Bellows Devices • Bellows Assemblies

FULTON SYLPHON
DIVISION

FIRST WITH BELLOWS

ROBERTSHAW-FULTON CONTROLS CO., KNOXVILLE 4, TENN

Canadian Representatives, Darling Brothers, Montreal

Exide-Ironclad BATTERIES

ARE YOUR BEST POWER BUY— AT ANY PRICE

They ASSURE high maneuverability of trucks ... rapid, accurate handling of material ... PROVIDE uniform rate of material handling with no unscheduled down time ... SHOW lowest costs of operation, maintenance, repair, depreciation, inherently safe. Call in an Exide Representative, and let him prove these facts.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 2

Exide Batteries of Canada, Limited, Toronto

"Exide-Ironclad" *Reg. Trade-mark U.S. Pat. Off.*

Bright and shiny AT DAY'S END...

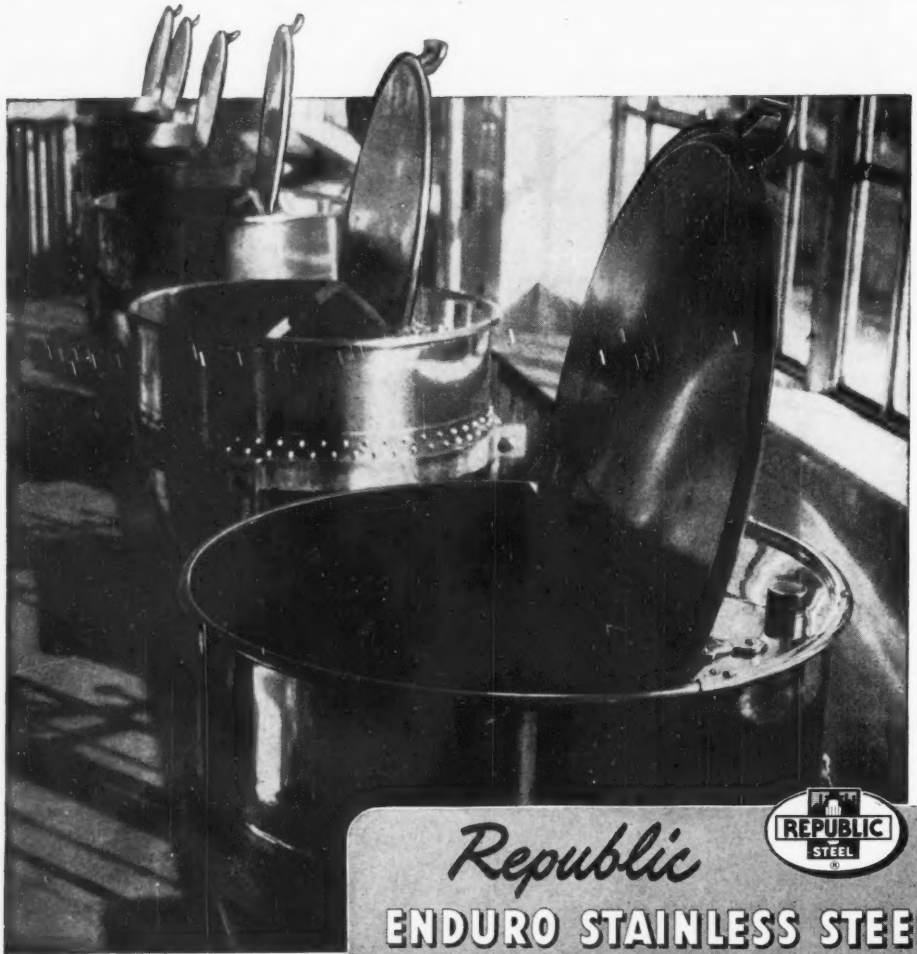
Bright as a new dime . . . and easy to keep that way—that's food processing equipment made of Republic ENDURO Stainless Steel.

With ENDURO, it's simple to start each batch in sparkling clean equipment . . . to switch from one product to another fast . . . as in this preserve and jelly packing plant. Between runs, the ENDURO kettles are merely rinsed with warm water. Even hard-to-handle stains—such as grape—flush away. No hard scrubbing. No danger of contaminating later batches.

In ten years, these 30-gallon ENDURO kettles have required no maintenance. Yet at the end of each day, they're bright and shiny as new. ENDURO lasts . . . saves other critical materials.

Your own present ENDURO equipment, with reasonable care, will see you productively through the years ahead. For suggestions on its care, and for the answers to any questions about it, write:

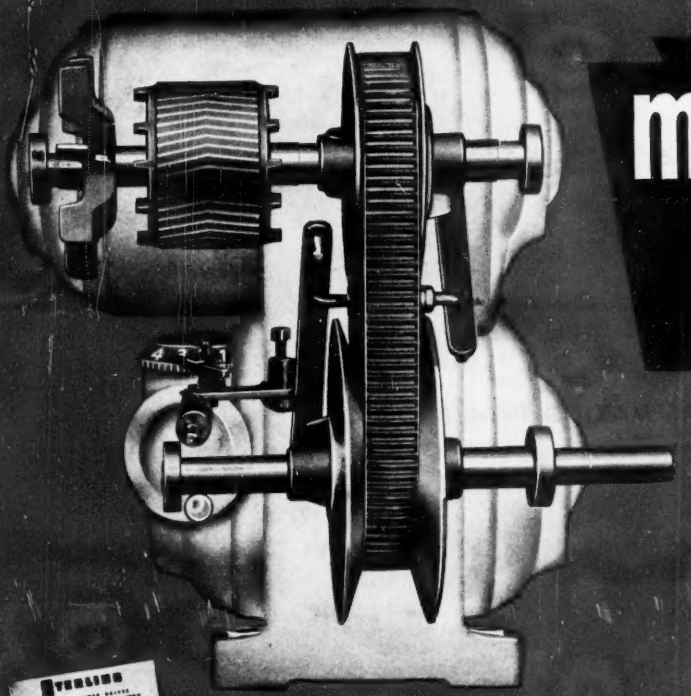
REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.



Republic
REPUBLIC STEEL
ENDURO STAINLESS STEEL

Other Republic Products include Ex-L-ite Tin Plate, Pipe, Sheets, Bolts and Nuts, Electrunite Tubing, Niles Barrels and Drums

power modernization



means

perfect speed control

Ask for your copy of pictorial bulletin No. B-60, showing Sterling Electric Power Drives Turning The Wheels of Industry.

STERLING SPEED-TROL

...GIVES YOU VARIABLE SPEED CONTROL NECESSARY FOR:

PROCESS CONTROL OF: Temperature — viscosity — level — pressure — flow — etc.

TIME CONTROL OF: Baking — drying — heating — cooking — pasteurizing — soaking — chemical action — etc.

EQUIPMENT ADAPTATION TO: Load variation — sequence synchronization. Size — tension — hardness or shape of materials to be processed — machined — conveyed — blended — mixed — etc.

VARIATIONS IN: Quality — quantity — operators' abilities — etc.

OUTSTANDING FEATURES:

Infinite speeds — positive speed regulation — fingertip control — large indicator — positive pulleys — no springs — protected — balanced design — streamlined — Herringbone Rotor — through ventilation — shielded ball bearings — versatile mounting — NEMA dimensions — shock absorbing — quiet operation — rugged — compact — dependable — long life.

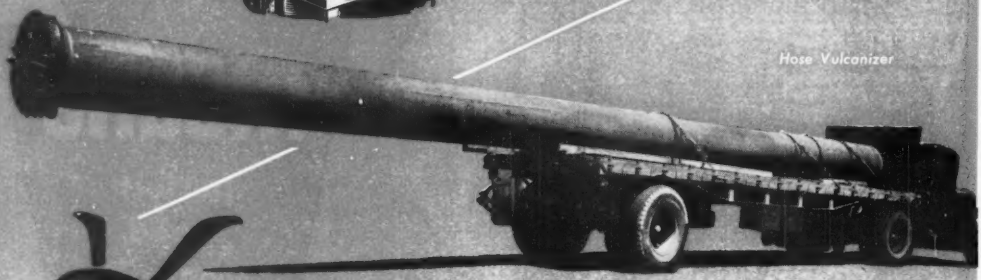
STERLING ELECTRIC MOTORS

Plants: New York 51, N. Y.; Los Angeles 22, California; Hamilton, Canada; Santiago, Chile.

Offices and distributors in all principal cities.

BACK IN THE 1880's

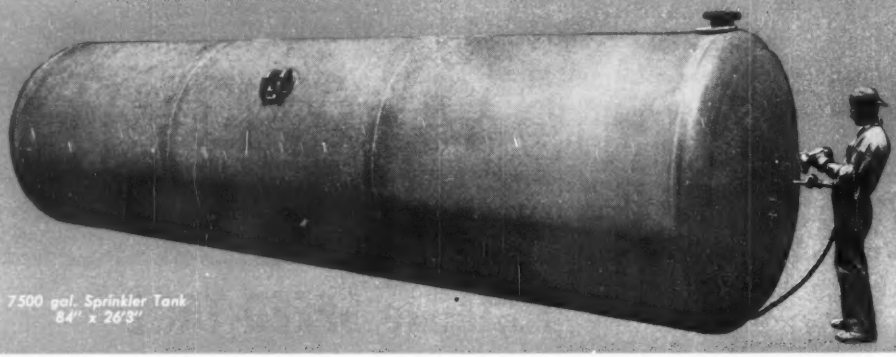
WHEN HERTZ DISCOVERED ELECTRIC WAVES



Hose Vulcanizer

Koven

WAS MAKING INDIVIDUALIZED FOOD EQUIPMENT



7500 gal. Sprinkler Tank 84" x 26'3"

The bridging of oceans—the linking together of mankind—Hertz opened the door on this and more. And even at that time, KOVEN, one of the leading steel fabricators today, was making food equipment. Now, after 70 years of service, KOVEN is naturally sensitive to problems facing the Food Industry. We realize rising costs compel peak production. And we know this means top efficiency. That is why we feel certain that our long experience in making Individualized Equipment can be of real value to you. Let us show you how we can tailor equipment to fit your most exacting needs—equipment that will assure greater production through greater efficiency. Simply call or write for a consultation. No obligation.

Our complete modern facilities include: machine, sheet and plate, welding and galvanizing shops, X-ray equipment and stress-relieving furnace. Among the many KOVEN products in all commercial and non-corrosive metals: Stainless Steel; Aluminum Sheet Fabrication; Boxes, Tote, Waste Cans; Chemical Apparatus; Coils and Pipe Bands; Copper Sheet Fabrication; Galvanizing Work; Mixers, All Kinds; Monel Metal Fabricators; Pails, Special Heavy; Pans, All Types, All Metals; Sinks, Scullery and Factory; Tables, Galvanized or Monel; Tanks, All Types, All Metals; Kettles, All Types, All Metals. Fabrication to A.S.M.E. Code Par. U-68 and U-69 a specialty.

L. O. KOVEN & BRO., INC.
154 Ogden Avenue
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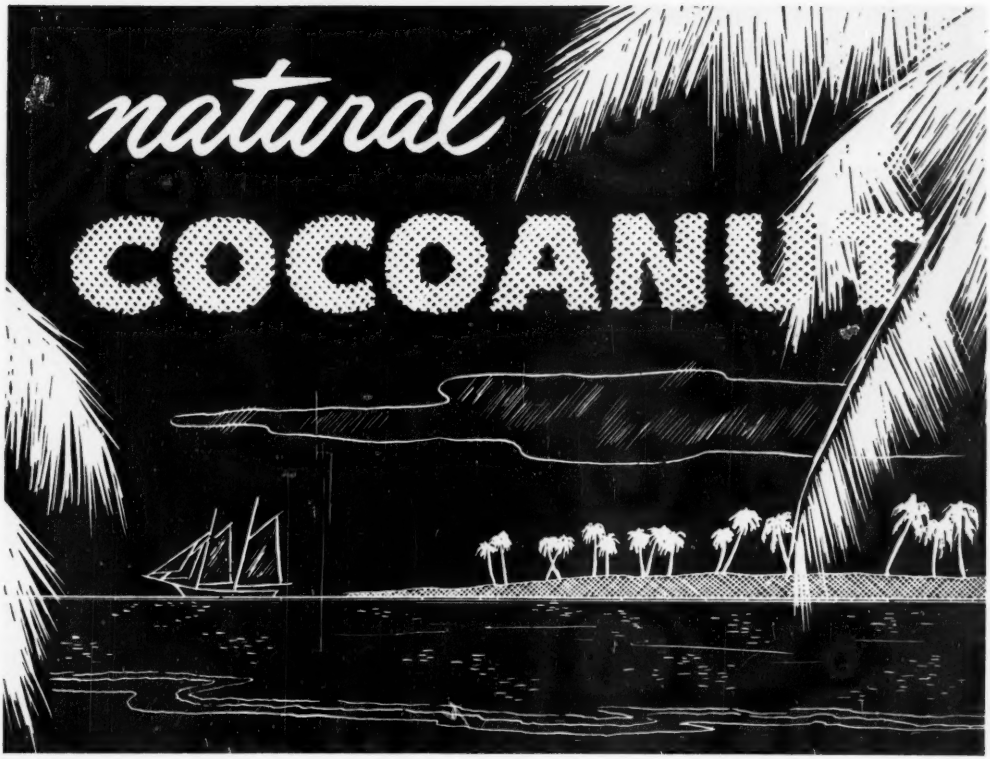
Dover, N. J.

KOVEN FOR INDIVIDUALIZED FOOD EQUIPMENT SINCE 1881



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In the instance of cocoanut flavor, Alva research has developed a basic formula which is obviously an improvement over similar commercial products.

This prime Alva formula has been successfully adapted in the development of imitation cocoanut flavors specifically designed for use in candies, ice-cream, baked goods and desserts.

Samples of Alva imitation cocoanut for your paticular use will be sent on request. Let us also send you the complete Alva catalog of flavors for all uses.

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521 WEST 57th STREET, NEW YORK 19, N. Y.

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Sales Manager
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Asst. Sales Mgr
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From Your Friends at
Sterwin Chemicals INC
To all our friends, our sincere wishes for a very Merry Christmas and a Happy and Prosperous New Year.
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VITAMINS • ENRICHMENT CONCENTRATES
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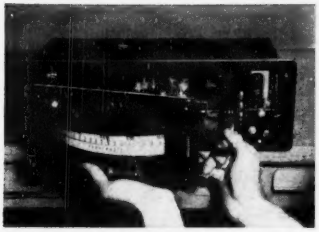


G-E Pyrometer Equipment Quick and Easy to Inspect, Maintain

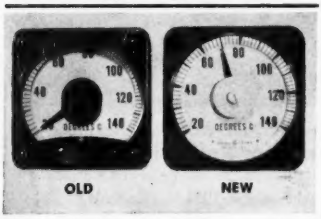
Routine inspections of new General Electric Type HP pyrometers can quickly be made. Besides making preventative maintenance easy, this equipment has many other features to provide accurate indication and temperature control of furnaces, ovens kilns, and other industrial heating equipment.

ACCURATE WITHIN ¾ **OF 1%** full scale, HP-3 pyrometers have automatic cold-junction compensation that adjusts for changes in ambient temperature.

Any change in temperature, even as small as 0.1% full scale, starts immediate control action. Normal changes in humidity, ambient, and voltage have little or no effect on the exactness of control action.

FOUR TYPES AVAILABLE—indicating, protecting, two- and three-position control forms; also both flush and surface mountings. All available in a variety of temperature ranges in the 0-3000 F span.

Mail the coupon for complete information about Type HP pyrometers.



New Shadow-proof Temperature Indicators Are Easier to Read

Temperatures from −100 F to +300 F can now be accurately indicated and controlled with General Electric's new line of temperature indicators. These instruments can be read from almost any angle. The dial is set forward, flush with the front of the case. A protruding convex-type glass front provides clear illumination. No more cover overhang; no more shadows caused by overhead lighting. Two sizes available—4¼- and 8¾-inches. Check coupon.

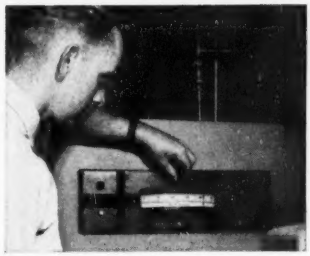
New Resistance Thermometers Accurately Indicate and Control Low Temperatures

TEMPERATURES FROM −100F to +300 F can now be accurately indicated and controlled with General Electric's new line of resistance thermometers. They indicate accurately within ¾ of 1 per cent full scale. Any change in temperature equivalent to 1/10 of 1 per cent full scale starts immediate control action.

Normal changes in humidity or room temperature do not affect the exactness of control. Neither does a change in control voltage. Sturdy, simple construction assures reliable operation under severe operating conditions.

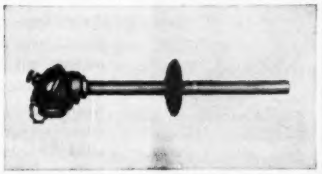
NARROW TEMPERATURE SPANS, as small as 90 degrees, are available anywhere in the −100 F to +300 F range. You can buy four types of resistance thermometers—indicators, protectors, and two- or three-position controllers—for either flush or surface mounting.

For complete information, mail the coupon below.



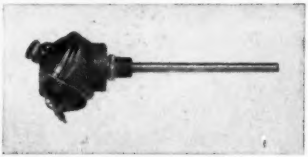
THERMOCOUPLE POTENTIOMETER measures temperature in locations inaccessible to glass-stem thermometers. Any number of different readings can be taken in rapid succession and accurate within ±0.2% of full scale.

Typical applications include refrigerator-development work, oil-burner and air-conditioning tests, steam temperature measurements, and heat-run tests on electric equipment. For complete information, mail the coupon below.



THERMOCOUPLES, COMPONENTS, AND ACCESSORIES for your pyrometer installations include protecting tubes and wells, thermocouple wire, ceramic insulators, extension wire, connectors, heads, selector switches. Send coupon today for catalog to help you obtain proper thermocouple assemblies.

Resistance Bulbs Accurate Within ±1 F between −100 F and +300 F



FOR ANY RESISTANCE THERMOMETER INSTALLATION, new G-E resistance bulbs offer a high degree of accuracy and reliability. They're available either with completely enclosed terminal head or without terminal head and with four feet of flexible cable. Units will retain calibration within 0.1 F. For complete information, mail the coupon below.

SECTION J602-227, GENERAL ELECTRIC
SCHENECTADY 5, N. Y.

Please send me the following bulletins:
Indicate:

- √ for reference only
- x for planning an immediate project
- ☐ Resistance Thermometer (GEC-835)
- ☐ Resistance Bulb (GEC-835)
- ☐ Type HP-3 Pyrometer (GEC-713)
- ☐ Temperature Indicators (GEC-218B)
- ☐ Thermocouples, Accessories (GEC-714)
- ☐ Thermocouple Potentiometer (GEC-245)

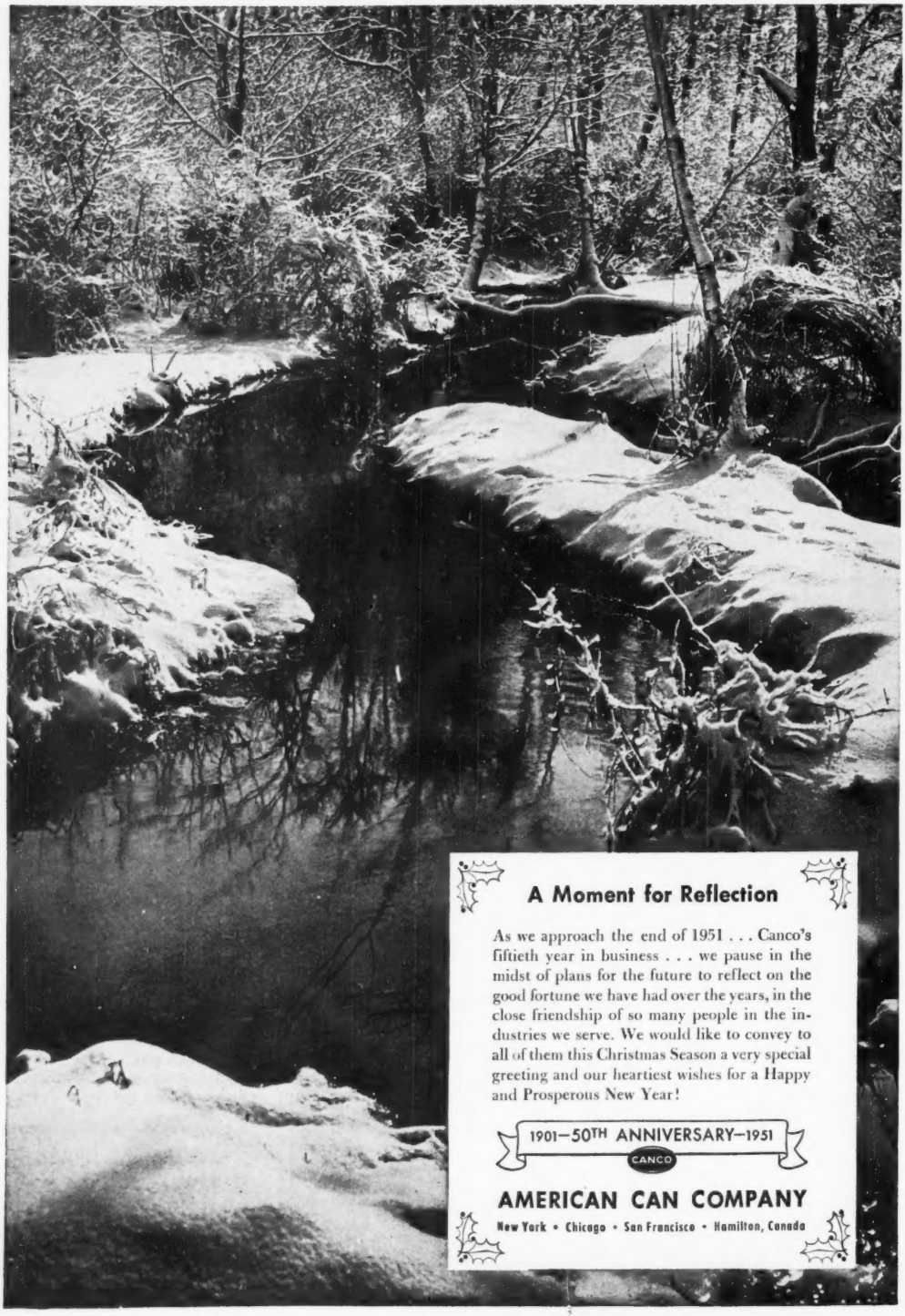
NAME .....

COMPANY .....

STREET .....

CITY ..... ZONE ..... STATE .....

GENERAL ELECTRIC



A Moment for Reflection

As we approach the end of 1951 . . . Canco's fiftieth year in business . . . we pause in the midst of plans for the future to reflect on the good fortune we have had over the years, in the close friendship of so many people in the industries we serve. We would like to convey to all of them this Christmas Season a very special greeting and our heartiest wishes for a Happy and Prosperous New Year!

1901—50TH ANNIVERSARY—1951

CANCO

AMERICAN CAN COMPANY

New York • Chicago • San Francisco • Hamilton, Canada

"How are these new aluminum kettles doing?"

"Great, Mr. Clemens*, we've increased our production considerably."

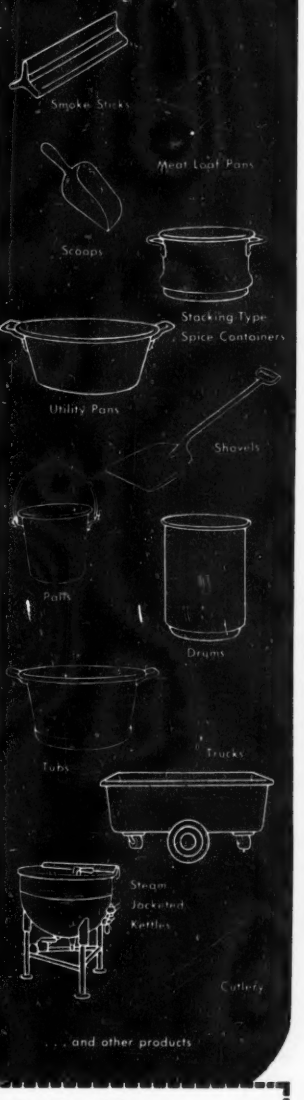
It's easy to understand why this and other food processors get enthusiastic about Wear-Ever Aluminum Steam Jacketed Kettles. For, when they convert to aluminum, the kettle department's production usually increases. This faster production is possible because aluminum spreads heat quickly and evenly *right to the top edge of the kettle.* Consequently, foods cook faster. And because the heat is spread so evenly, they cook better; scorching and burning are practically eliminated.

Moreover, every Wear-Ever Steam Jacketed Kettle—like all Wear-Ever food plant equipment—is made of an extra tough, extra hard aluminum alloy. Wear-Ever kettles have set amazing records for 20 to 30 years of continuous service—records which kettles made of the new hard alloy are sure to surpass some day.

For details on Wear-Ever's complete line of food plant equipment, see your Wear-Ever representative or mail the coupon below.

*Mr. Ezra S. Clemens
Hatfield Packing Co., Hatfield, Pa.

WEAR-EVER ALUMINUM EQUIPMENT FOR FOOD PLANTS



WEAR-EVER Aluminum

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT. OFF.

Standard of Quality for more than 50 years

The Aluminum Cooking Utensil Company
312 Wear-Ever Building, New Kensington, Pa.

Please send me full details about your line of sanitary, hard-alloy aluminum kettles and other food plant equipment.

NAME.....

ADDRESS.....

Fill in, clip to your letterhead, and mail

..Want to "UP GRADE" Product Quality?

the CHERRY-BURRELL Round Processor

The way you mix, blend, heat and cool your liquid food products directly affects your ultimate quality — and profit.
Cherry-Burrell Round Processors are rugged, all-purpose processing vats that can put more quality and uniformity into many phases of food preparation.

Sanitary: all product contact surfaces of gleaming, easy-to-clean stainless steel.

Efficient: in heating, cooling. Low pumping head saves power.

Heavy-duty mixing: fast and complete mixing of all ingredients. Two-speed agitator and adjustable baffle for controlled mixing of average viscosity liquids. Special scraper blade agitator for mixing and cooling heavy bodied products.

Saves time: because it heats, cools, mixes fast. Automatic control available.

Long life, low upkeep: specially built to handle heavy-bodied products.

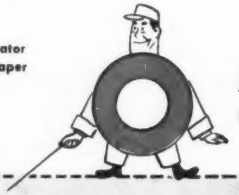
CHERRY-BURRELL CORPORATION

General Sales and Executive Office:
427 W. Randolph Street, Chicago 6, Ill
Milk and Food Plant Equipment and Supplies
FACTORIES, WAREHOUSES, BRANCHES, OFFICES OR DISTRIBUTORS AT YOUR SERVICE IN 36 CITIES

trendmaker in a great industry

Send for Details

Round Processors are built in sizes from 300 to 1000 gallons. Three types: spray type—fastest heating with steam, well water and sweet water cooling; water wall type—fast heating and cooling with recirculated water under pressure; cold wall type—probably the only vat made for steam heating and direct expansion cooling.



Use this Coupon

Cherry-Burrell Corporation
Dept. 117, 427 W. Randolph St.
Chicago 6, Illinois

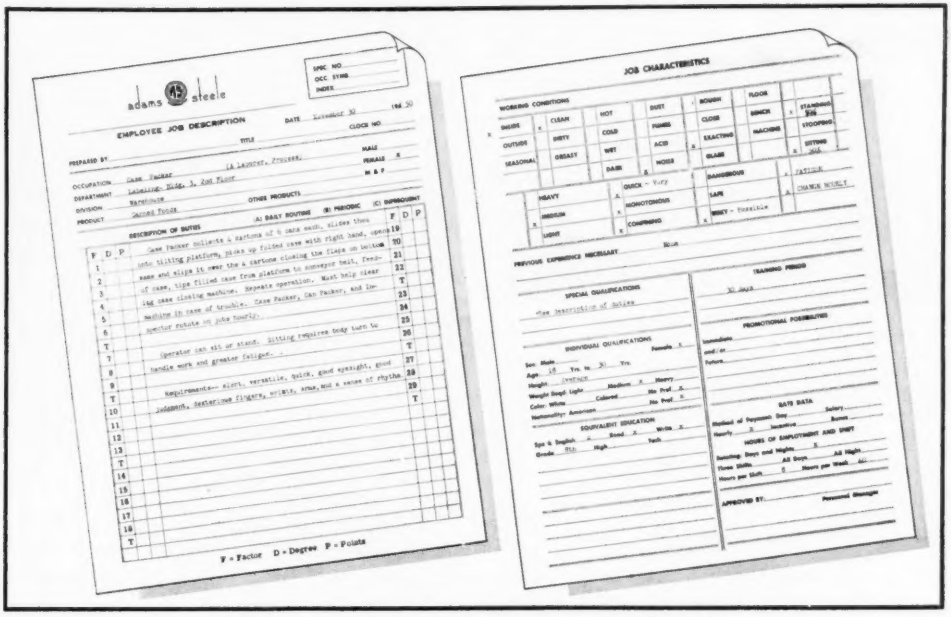
Send Round Processor Literature

Name .....

Firm Name .....

Address .....

City ..... State .....



"Breakdown" of Work Is Key to the Right Candidate

JOB DESCRIPTION form (front on left; back, right) filled to show use. Where clarity requires, work phases may be indicated as daily routine, periodic, or infrequent by letters (A), (B), or (C), respectively. Columns "F", "D" and "P" (not used here) may be employed to "break down" a job according to standard factors included with system. Thus, if Factor 1 is education, degree of schooling needed is coded under "D" and points assigned jotted under "P". Ratings of standard-factor groups are then totalled at points marked "T" in Column "F."

SHORT-CUTS In Picking Ace Workers

Midwest canneries cut labor turnover, boost output, and simplify up-grading with system that analyzes the specific jobs, then "measures the applicants to fit"

J. S. WALTERS
President, Adams-Steele, Inc.,
Management Engineers, Chicago

Selection of productive, high-grade, food plant workers can be greatly simplified by using several statistically sound short-cuts.

This was recently demonstrated by the success of a new personnel selection scheme launched by a medium sized cannery. Proving rapid, economical, and dependable, it was developed as a result of the company's fundamental thinking that "fast fingers, good eyesight, and an untiring back are the prime requisites for the cannery." The person with these qualifications rates foremost for company job-openings.

The new personnel procedure augments the company's regular physical, visual, and intelligence tests with:

1. Job-description data on handy forms,
2. "Tailor-made" physical exams, and
3. A quick and accurate hand dexterity test.

■ **Through proper interpretation of the test results, over 90 percent of the applicants hired have proved satisfactory.**

With ordinary selection methods, a certain percentage of high grade personnel may be obtained. However, turnover often depletes this restrictively selected group and creates a deficiency in the company's key personnel.

It has been learned from experience that scientific selection will increase the ratio of high grade personnel initially hired and assist in up-grading capable employees to other jobs.

Research has revealed that job applicants may vary significantly in productivity, indicating that the better employee would make a much greater contribution than the poorest caliber applicant.

Psychologist Donald Laird, reporting his observations on productivity in several different occupations, states, for example, that the best coal miner produced 12 times as much coal as the

poorest. In a cotton mill he found the difference to be 2 to 1. And in his overall study the best worker produced twice as much as the poorest grade.

Job Specs Come First

The first requisite in developing an adequate aptitude testing program is an accurate job description. More and more companies in the food processing field are making job evaluation studies to compile these specifications. Where no such studies have been made, writing up the description of the work at various stations becomes the initial step. These specifications should be thoroughly understood by employees as well as administrators.

Next, tailor-made physical check-ups should augment regular routine medical exams. Many jobs have unusual conditions requiring special physical effort. Hence, the medical examiner should be familiar with the job requirements.

Importance of this can be seen when considering, for instance, that a job may call for the employee walking two miles daily as well as lifting ten pounds 50 times each day.

The physical exam may reveal that the condition of the applicant's feet will not permit such walking. It is also possible that an applicant may *look* strong and healthy, whereas in reality his general physical condition may be only fair and his potential muscular energy low. This fellow would not long remain on a job which required lifting 500 lb. daily.

It is important that these facts be determined *before* an applicant is hired and trained.

This vital information enables the employment officer to place applicants where they have the best opportunity to succeed as well as become a profitable investment for the company.

Industry has many jobs calling for manual skill along with an alert mind. While hand dexterity tests are important in determining performance in many industrial jobs, they are *especially* valuable in the majority of food processing operations.

A hand dexterity test which has proven to be very valuable is made with a board holding 10 pegs and 100 disks. The person being tested is required to place the disks on the pegs, one at a time, until the whole 100 are in equal piles of 10 on the 10 pegs. First, he uses his right hand alone to complete the test, then his left, next both hands simultaneously, and finally both hands alternately.

His score, determined by the elapsed time consumed during these four trials, is checked against a table of standards. The score is high, of course, if he takes a very short time to complete the tests, and low where the time required is long.

The test measures the speed and accuracy of the eye, also hand and arm coordination—factors which are especially pertinent in the industry. Intelligence is a secondary factor.

Cannery Aims for Best

A certain Midwest cannery developed a program aiming at selection of the very best people available in the locality. It employed the aforementioned test technics, matching them to the job specs. Required were employees who could work rapidly, operate semi-automatic machinery, and detect flaws in raw material or finished products passing over a conveyor. Hand dexterity tests were primary in culling the company's applicants.

Effectiveness of this program was evidenced in careful weighing of the results.

Due to an extreme manpower shortage at the time, the personnel department was inclined to hire almost all of the applicants, regardless of the score made on the tests. In more normal times, employment would not have been given many of the accepted 173 candidates—that is, those whom the tests would have eliminated.

After a number of months, the plant supervisors were asked to rate the 173 employees as "satisfactory" or "unsatisfactory". These ratings were then reviewed against the original tests.

The mean time to complete the hand dexterity tests was set at 9 min., after determining that a fast person could complete them in a total of 7 min., while the slow or inept took 12. As indicated, however, the company was forced to hire most of those taking more than 9 min. because of the labor circumstances.

This was an ideal situation from a research point of view, since it provided a contrast which would have been impossible had the company employed only those taking less then 9 min.

Upon classification of the 173 employees, there were 79 who were rated satisfactory, 94 unsatisfactory. Of the "satisfactories," 62 (78 percent) had passed the dexterity test, but of the "unsatisfactories", only 26 (28 percent) had cleared this hurdle.

As a corollary, the tests might have eliminated 17 persons who proved to be able to do the work and would have passed 26 who later were shown to be lacking.

Of the 26, there were 14 who failed the intelligence test and would have been eliminated on that count. Therefore, a combination of the intelligence and dexterity tests failed to eliminate only 12 out of 94 who turned out to be unsatisfactory.

What about the 17 "satisfactories" who had failed in the dexterity test? When consideration was given to the results of the intelligence test, 12 would have scored better than average, thus earning a job somewhere in the organization. And so, in the final analysis, the tests would have eliminated only 5 of those who eventually made good.

Overall, the tests would have failed in only 17 of the 173 cases—12 "unsatisfactories" and 5 "satisfactories." This is certainly a good showing.

"Interview Guessing" Can't Match It

The present indications are that the labor shortage may repeat, making it compulsory to take almost any applicant. But in using the tests, this cannery obtained very definite information for its subsequent guidance. It now knows that those who pass both the dexterity and intelligence tests are going to be more satisfactory workers than those who fail.

This leaves a third group—those prospects who take more than 9 min. for the dexterity test but rate above par in the intelligence test, and those who took less than the standard time for the dexterity test but rated below average in the intelligence test. Further tests can be given here. Or final decisions can be based on additional talks with the prospects.

It is not implied that aptitude tests

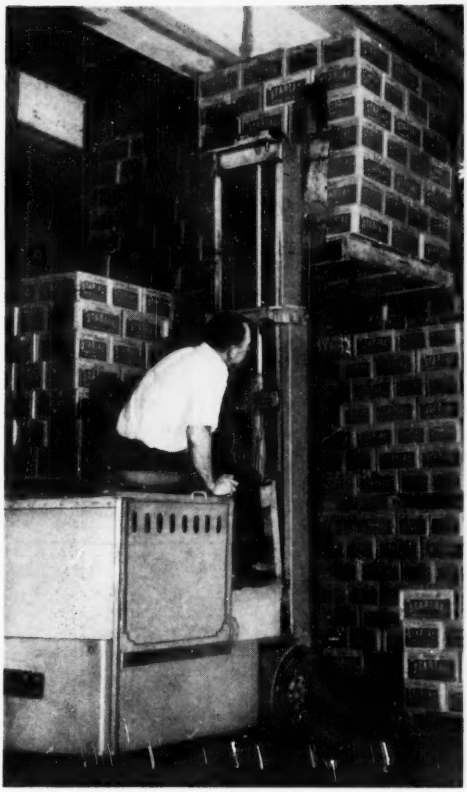
(*Turn to page* 147)

Catching Up on the Hiring Side

At the outbreak of World War II, the conventional technics employed by personnel managements in the food industry were probably half a century behind the advanced methods attained in product development and production. Human relations were generally left to guesswork. Hence, there was an urgent need for efficient personnel policies and practices.

These unbalanced trends were accentuated during the war. Then, however, a change in the personnel approach—humanics—began in most industries and was especially marked in the food field. And it should be especially noted here that "humanics" is not a mysterious or technological term but instead descriptively identifies the application of scientific methods to human relationships.

A basic cause of labor turnover and employee discontent is faulty, lack-logic employee selection. Taking its place today is sound, scientific selection, which can reduce labor turnover and increase productivity—as is lucidly evidenced in the accompanying article.



Tiers the pallets ceiling high

Speedily unloads "flats"

"Zip" and they're on the elevator

Mechanization Solves Problem of

Moving Them by the Millions

Borden reaps all-around advantages by marshalling fast fork-lift trucks to "work" 3,000,000 containers annually through exacting receiving-and-shipping schedule at its New York City warehouse

BY ENTIRELY eliminating manual handling of materials at its warehouse facilities in St. John's Freight Terminal Building, New York City, Borden Co. has gained substantial savings in time, man-hours, and effort.

■ **Indeed, the company's present method of handling freight is so effective that 80 percent more goods are loaded, or unloaded and stacked—and with considerably less man-hours—than in previous operations. As an example of the speed in which loads can be handled, a carload of merchandise, numbering from 1,000 to 3,000 cases can be entirely warehoused in 1 hr.**

Occupying some 50,000 sq. ft. on the building's third floor, the company receives and ships, in one year, a total of some 3,000,000 cartons, drums, and barrels, containing such foodstuffs as cheese, processed milk and coffee.

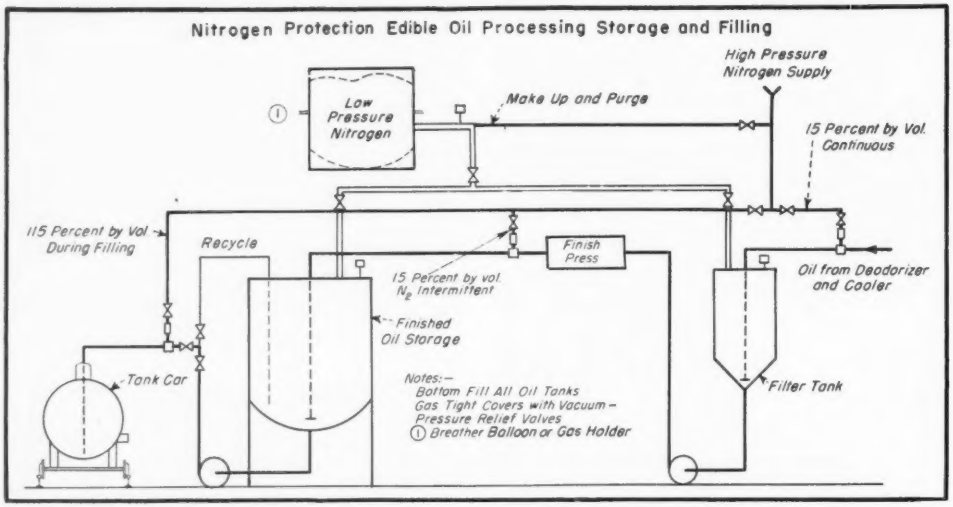
To expedite this volume of merchandise, a number of heavy-duty, battery-powered fork-lift trucks—owned and operated by Borden—and several thousand pallets are employed—plus the freight handling facilities of the New York Central Railroad, owner of the lower west-side terminal warehouse.

Coordinated Handling

Incoming goods are palletized at the freight cars, placed onto 4-wheel flat trucks, then moved by elevator to the third floor warehouse area. This initial operation is handled solely by the railroad employees and equipment.

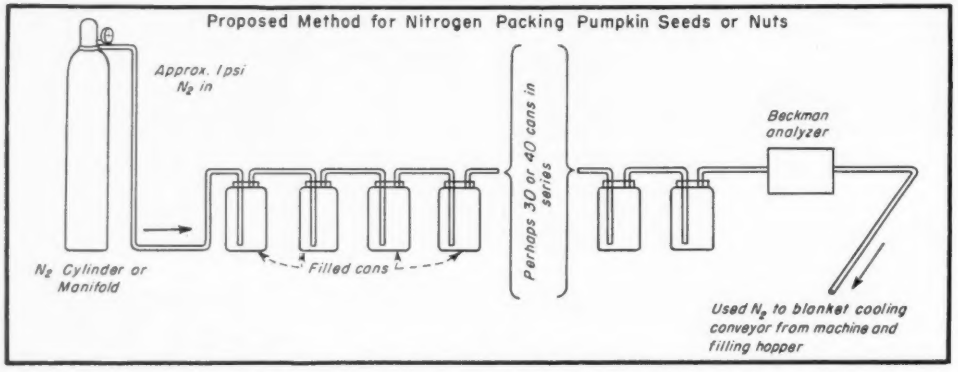
(*Turn to page 200*)

Processing Edible Oils


Nitrogen Protection Edible Oil Processing Storage and Filling
High Pressure Nitrogen Supply
Low Pressure Nitrogen
Make Up and Purge
15 Percent by Vol. Continuous
115 Percent by Vol During Filling
Recycle
Finish Press
15 Percent by vol. N_2 Intermittent
Oil from Deodorizer and Cooler
Finished Oil Storage
Tank Car
Filter Tank
Notes:—
Bottom Fill All Oil Tanks
Gas Tight Covers with Vacuum—Pressure Relief Valves
① Breather Balloon or Gas Holder

FLOW DIAGRAM shows how nitrogen is used to protect oils from oxidative changes during processing and storage.

Packaging Seeds or Nuts


Proposed Method for Nitrogen Packing Pumpkin Seeds or Nuts
Approx. 1psi N_2 in
Perhaps 30 or 40 cans in series
Beckman analyzer
N_2 Cylinder or Manifold
Filled cans
Used N_2 to blanket cooling conveyor from machine and filling hopper

PROPOSED nitrogen-gas system for purging oxygen from a series of jars containing seeds or various nut meats.

INERT GAS: Safeguard of Quality

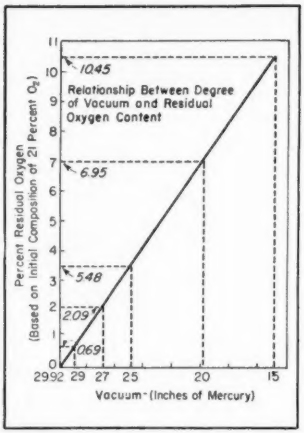
In processing and packaging foods, vitamins are retained, objectionable discoloration averted, and off-flavors curbed by using nitrogen to ban harmful oxidation

T. W. ESELGROTH
The Linde Air Products Co.,
Div. Union Carbide & Carbon Corp., New York City

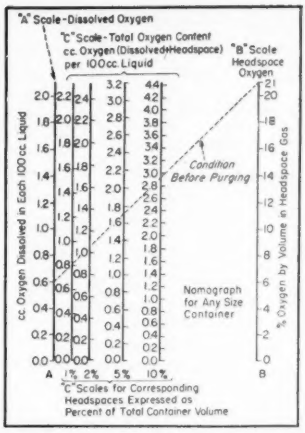
The value of nitrogen processing and packaging is becoming more apparent every day. New equipment is being manufactured to incorporate nitrogen protection. Existing equipment is being revised to permit its application. And new materials are being used for packaging.

Object of these recent efforts is to produce foods that will keep fresher, retain better appearance, flavor, taste and nutritive values. Nitrogen is helping the food industry to solve many of the problems associated with the attainment of its goal—production of better quality foods.

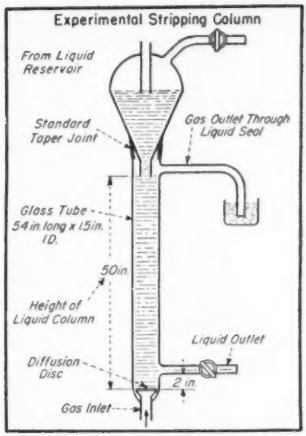
■ **Broad applicability of the inert gas**



AMOUNT of oxygen remaining in a package reaches a low level as absolute vacuum is approached. **FIG. 1**


"A" Scale-Dissolved Oxygen
"C" Scale-Total Oxygen Content cc. Oxygen (Dissolved+Headspace) per 100cc Liquid
"B" Scale Headspace Oxygen
cc. Oxygen Dissolved in Each 100cc Liquid
% Oxygen by Volume in Headspace Gas
Condition Before Purging
Nomograph for Any Size Container
A
1% 2% 5% 10%
B
"C" Scales for Corresponding Headspaces Expressed as Percent of Total Container Volume

NOMOGRAPH: Relation of free space and dissolved oxygen to total oxygen in liquid-food containers. **FIG. 2**



NITROGEN counter-current stripping column. Liquid product enters top. Gas through frits at bottom. **FIG. 3**

is notable. Some of the foods processed or packaged under nitrogen are: Edible oils, shortening products, margarine, coffee, dried milk, dry activated yeast, nut meats, orange and other citrus juices and powders, mayonnaise, dried beef, sandwich meats, bacon, sausages, sour cherries, cranberry jelly, dehydrated potatoes, apple juice, powdered eggs, ice cream mix, potato chips and similar oil-fried products, chicken noddle soup mix, dehydrated cabbage, dehydrated carrots, shredded coconut, tomato juice, baby foods, wine, cream and butter oil.

The destructive action of atmospheric oxygen on various perishable foods has long been the subject of extensive studies. Many new materials, processing technics, and packaging methods have been developed in an attempt to solve this serious problem. But the ultimate benefits of such improvements usually depend on the effectiveness of oxygen removal and its subsequent exclusion during normal product shelf-life.

Use of nitrogen for such protection of food products, although not new, has come to be recognized as one of the most promising ways of preserving desirable food qualities. We will briefly review the results of both laboratory and production-line studies of the use of this gas.

Oxygen vs. Light and Heat

Many unstable food products deteriorate because of entrained, dissolved, or headspace oxygen. Light and heat have often been blamed for product breakdown—when actually oxygen was the culprit. Peroxide formation in fats and oils, with resulting rancidity, has for many years been the subject of intense study. Vitamin retention has undergone extensive investigation.

Today, even unstable products must be brought out in the open where the consumer can see and buy them. They can no longer be shielded from light and heat. Such products must necessarily be oxygen-free when packaged and must remain that way to enjoy reasonable shelf-life. They must reach the customer showing good color and having fresh flavor, aroma, and proper nutritive balance.

Vacuum vs. Nitrogen

The purpose of vacuum-processing is to remove and exclude oxygen. Effectiveness here is dependent upon the removal of entrained or dissolved oxygen, and exclusion from atmospheric exposure during subsequent operations. Therefore, the products must be processed and packed under sufficient vacuum to attain the desired oxygen-free conditions.

Vacuum packaging has been largely confined to rigid containers, since most items, when packed in flexible film under reduced pressures, do not present a pleasing appearance.

Much laboratory work has been carried out on vacuum and nitrogen gassing technics. In the past, little effort was made to evaluate the results as a function of the total residual oxygen. Vacuum or nitrogen gassing, when lacking proper control, has resulted in obscuring many of the possible benefits. It is important to know residual oxygen content if protective effects are ultimately to be achieved.

Referring to Fig. 1, the percentage of oxygen remaining with various degrees of vacuum is apparent. Atmospheric air is about one-fifth oxygen, the remainder consisting mainly of nitrogen. As absolute vacuum is approached, the amount of oxygen remaining in a package reaches a very low value. Commercial vacuum systems used on production lines do not reach absolute vacuum, so there is always some residual oxygen present.

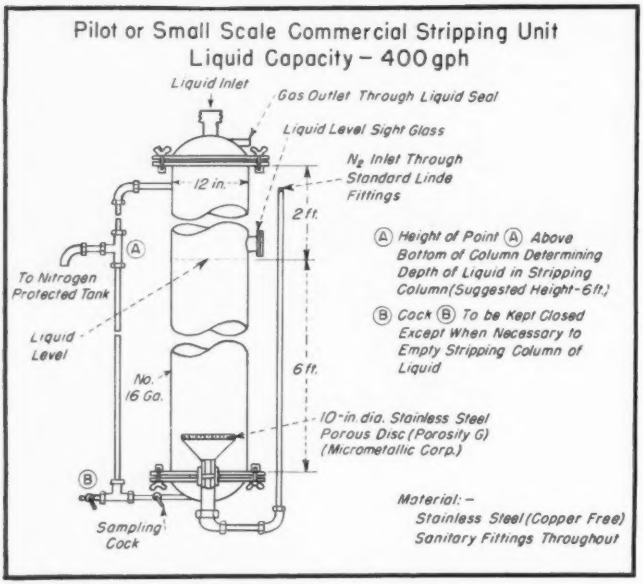
A vacuum of 27 in. of Hg results in 2.09 percent residual oxygen, and a 29-in. vacuum leaves 0.69 percent residual oxygen. Therefore, in order to obtain a residual oxygen content of less than 1 percent, a vacuum of better than 28 in. is required.

Since breaking back a vacuum with nitrogen does not reduce the amount of oxygen present, it is important that high purity nitrogen be employed. For example, using nitrogen containing 0.5 percent of oxygen to break a vacuum of 29 in. will give a residual oxygen content of 0.69 plus 0.5, or 1.19 percent. Furthermore, if the product contains dissolved or entrained oxygen, treatment of the free space with nitrogen may have little effect on the total oxygen content. Thus, packaging of an unstable product under either vacuum or nitrogen headspace may not be the complete solution.

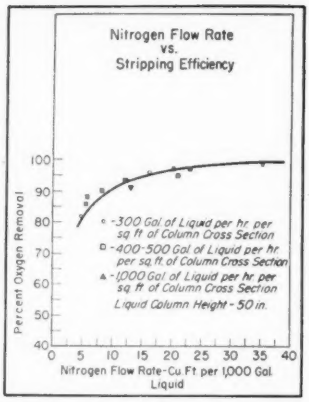
Free Space vs. Dissolved Oxygen

Fig. 2 shows the relation of the free space and dissolved oxygen to total oxygen in liquid food containers. The oxygen tolerance of individual food products may be determined by experimental storage stability evaluation.

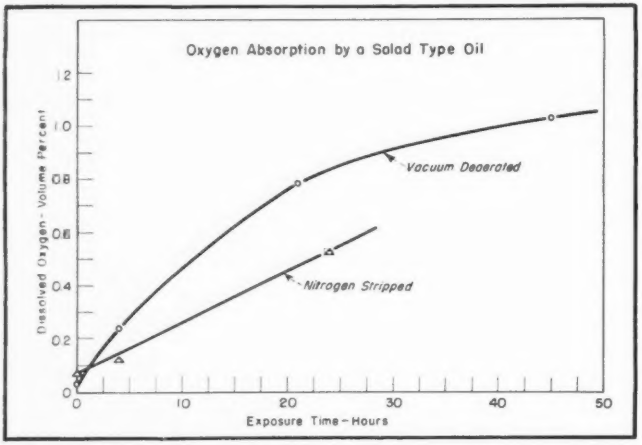
The methods required to attain the


Pilot or Small Scale Commercial Stripping Unit
Liquid Capacity – 400 gph
Liquid Inlet
Gas Outlet Through Liquid Seal
Liquid Level Sight Glass
N_2 Inlet Through Standard Linde Fittings
12 in.
2 ft.
Ⓐ Height of Point Ⓐ Above Bottom of Column Determining Depth of Liquid in Stripping Column (Suggested Height – 6 ft.)
Ⓑ Cock Ⓑ To be Kept Closed Except When Necessary to Empty Stripping Column of Liquid
To Nitrogen Protected Tank
Liquid Level
No. 16 Ga.
6 ft.
10-in. dia. Stainless Steel Porous Disc (Porosity G) (Micrometallic Corp.)
Material: – Stainless Steel (Copper Free) Sanitary Fittings Throughout
Sampling Cock

THIS commercial stainless steel column is employed for continuous nitrogen stripping of approximately 400 gal. of fruit juices per hour. **FIG. 4**


Nitrogen Flow Rate vs. Stripping Efficiency
Percent Oxygen Removal
100
90
80
70
60
50
40
0 5 10 15 20 25 30 35 40
Nitrogen Flow Rate-Cu Ft per 1,000 Gal. Liquid
○ - 300 Gal. of Liquid per hr. per sq. ft. of Column Cross Section
□ - 400-500 Gal. of Liquid per hr. per sq. ft. of Column Cross Section
△ - 1,000 Gal. of Liquid per hr. per sq. ft. of Column Cross Section
Liquid Column Height - 50 in.

ABOUT 97 percent oxygen is removed from liquids by using a 20-cu.-ft. flow of nitrogen per 1,000-gal. **FIG. 5**



ABSORPTION of oxygen is slower with nitrogen-stripped edible oil than with vacuum-deaerated oil (both oils exposed to atmosphere). **FIG. 6**

desired oxygen level may then be defined by means of the nomograph. For example, a product contains 0.6 cc. of dissolved oxygen per 100 cc. of liquid and a headspace of 10 percent of the entire volume. If packed with air in the headspace, the total oxygen content will be about 2.95 cc. per 100 cc. of liquid. With nitrogen-jet headspace purging, the total oxygen could be reduced to about 0.8 cc. Reducing the volume or size of the headspace would also reduce the total. Nitrogen stripping of the product would still reduce residual oxygen.

It must be remembered that the benefits from all this preparation of the product can be lost if a good container closure is not effected. If the available vacuum equipment does not reduce oxygen levels sufficiently, a break-back with nitrogen and a second evacuation will improve the residual oxygen content.

Nitrogen Purging

Headspace nitrogen-jet purging is similar to steam-jet purging. The jet of nitrogen sweeps out the air ahead of it and can reduce the oxygen concentration to about 1 percent using standard machines. This has been found satisfactory in products which are either canned or bottled.

Another method is tandem purging. Nitrogen is flushed from one food container to another in a closed system. It requires a volume of nitrogen equivalent to the total free space of all containers in the line, plus an amount equal to a sixfold purge of a single container. This method can be used for dry solids like nuts and potato chips if a vacuum system is not available.

A system of purging a number of jars containing nut meats is diagrammed at beginning of article. With nitrogen flowing, and after six free space volumes of gas have passed, the first container will have less than ½ percent of oxygen, and so on down the line for each additional unit volume.

Nitrogen Stripping

Oxygen dissolved in liquid food products can be removed by displacement with nitrogen. Counter-current stripping with nitrogen gas permits a continuous product flow and, in addition, does not remove volatile flavor and odor essence. Nitrogen stripping effectively removes dissolved oxygen, and it is a simple operation. It is automatic and no moving parts are required.

Fig. 3 shows the operation of a nitrogen counter-current stripping column. The liquid product enters at the top and nitrogen at the bottom through a porous stainless steel element or glass frit. The size of the column depends upon the volume rate

of the product to be stripped. The proper relation of column height to diameter is maintained at a value which gives the best stripping efficiency.

Fig. 4 shows a commercial stainless steel column capable of continuously stripping liquids such as fruit juices at 400 gal. per hour. Due to differences in their partial pressures, the nitrogen gas bubbles entrap the dissolved gases when passing up through the solution and carry them out through the trap.

Efficiency up to 97 percent removal has been obtained in aqueous solutions using a nitrogen flow rate of 20 cu. ft. per 1,000 gal. of liquid processed (see Fig. 5). Edible oils and fats require approximately 100 cu. ft. per 1,000 gal. treated.

Nitrogen Stripping vs. Vacuum Deaerating

Nitrogen stripping of orange juices at 77 deg. F. does not remove any significant quantity of volatile materials. Natural flavor and aromas remain in the product. It removes 100 percent of the oxygen, with an 0.002 percent condensate loss.

Vacuum deaerating at 104 deg. F., on the other hand, removes volatile components that contribute to aroma and flavor and only 77 percent oxygen with a 1.8 percent condensate loss.

Peroxide formation in edible oils and fats can be eliminated by effective nitrogen processing and packaging. When oxygen has been removed and can be kept out, light and storage temperature have no deleterious effect, and shelf-life is extended indefinitely.

An additional benefit derived from nitrogen-stripped oil is shown in Fig. 6. Oxygen absorption by nitrogen-stripped oil, when subjected to atmospheric storage, takes longer than by vacuum-deaerated oil.

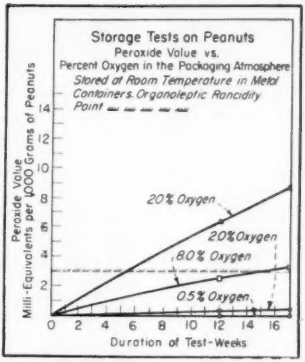
The effect of oxygen on crushed apples and apple juice is significant. Experience has shown that clarified juices obtained in this manner do not darken when exposed to air for an extended period.

2 Percent Oxygen Okay

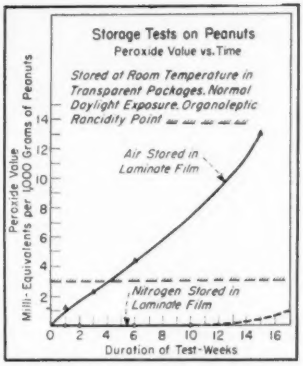
Fig. 7 is an outstanding example of oxidation prevention. It compares the increase in peroxide value of peanuts over a period of time to the oxygen content of the packaging atmosphere. A peroxide value of 3 milliequivalents per 1,000g of peanuts is the point at which rancidity is detectable by taste. With oxygen at 20 percent, peanuts were judged rancid after less than six weeks under atmospheric storage conditions. The improvement of shelf-life under 2 percent oxygen atmospheres is considered satisfactory for all commercial applications.

Potato chips, nuts, and many other products, can be packaged in flexible transparent films under nitrogen. Fig. 8 compares the rate of peroxide development in peanuts packaged in a laminate film under air and under nitrogen. Delamination of the packaging material started to take place at the end of ten weeks and, consequently, oxidation took place. Improved packaging materials, however, are now available and are being used successfully for commercial applications. Their use with nitrogen indicates that a non-rancid shelf-life of at least six months may be assured.

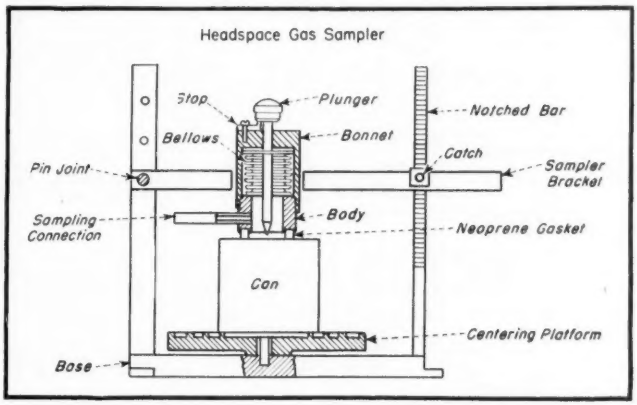
Choice of film, which is very important, requires an accurate knowledge of the rate oxygen diffuses through the film. Assuming a film package to be free of pin holes and having good seals, oxygen from the air can be transmitted to the product by diffusion. The film absorbs oxygen from the air. Because of the difference between the partial pressure of oxygen within the package and the surrounding atmosphere, oxygen enters the package and reacts with the unstable product. A film that is impermeable to moisture is not necessarily impermeable to oxygen. Products packaged under vacuum often may appear to be gas-tight. But unless the film possesses an inherently low oxygen permeability, product deterioration by chemical absorption of diffused oxygen may occur without apparent loss of vacuum.



SHELF-LIFE of peanuts packaged under 2 percent oxygen is satisfactory for commercial purposes. **FIG. 7**


Storage Tests on Peanuts
Peroxide Value vs. Time
Stored at Room Temperature in Transparent Packages. Normal Daylight Exposure. Organoleptic Rancidity Point
Peroxide Value
Milli-Equivalents per 1000 Grams of Peanuts
Air Stored in Laminate Film
Nitrogen Stored in Laminate Film
Duration of Test-Weeks

PEROXIDE VALUES of peanuts were lower in nitrogen-packed samples than in air-packaged samples. **FIG. 8**



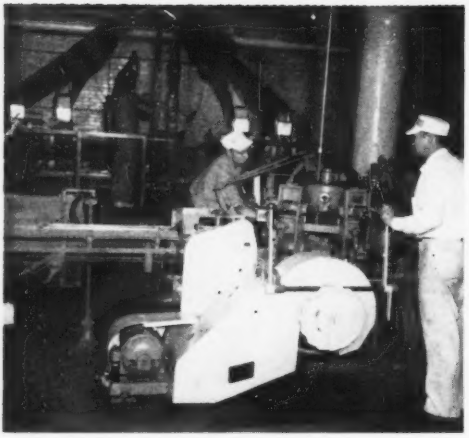
HEADSPACE gas sampler. System is evacuated and can is punctured to release gas into desorber bulb of analyzer. **FIG. 9**

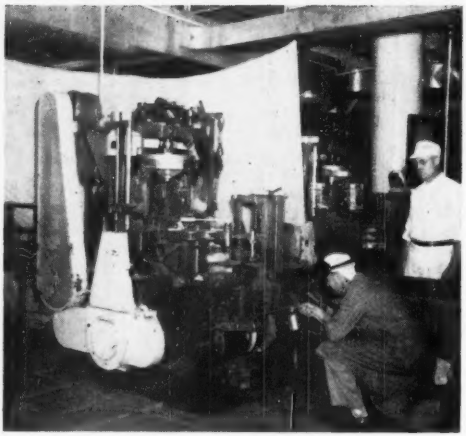
Gas Analysis Determination

To be certain of packaging conditions, sample containers should be tested during packaging, and also stored samples should be checked occasionally. A simplified Orsat apparatus has been devised for analyzing dissolved and headspace oxygen and carbon dioxide, and it will give satisfactory accuracy on a few cc. of gas.*

(*Turn to page* 153)

* This apparatus is further detailed in the article, "Wrapper Test Promises More Shelf-Life", p. 56, Nov. '49 *Food Industries*.





PACKAGING MACHINES must be maintained in A-1 condition to keep them running efficiently. Required are trained mechanics, a corrective maintenance program, a lubricating schedule, and periodic overhauling of equipment. Left photo: Mechanics make adjustments on a Pneumatic Scale double package-making unit. Right: Maintenance men clean high-speed bottom-sealing machine. Deo-Base is pressure-sprayed on machine to cut the grease. Then an air hose is employed for final blow-down. Note canvas sheet around machine to confine the dust.

Getting More From YOUR PACKAGING LINE

34 Pointed Q&A's Tell How

Here are brass-tack answers to significant food-packaging questions raised at the recent Packaging Institute Forum. Covered are subjects on maintenance, production, organization of personnel, selection of equipment, and layout and operation of lines for greater efficiency

W. P. SCHOMMER
Manufacturing Dept., General Mills, Inc., Minneapolis, Minn.

Editor's note: In the following fact-packed Q-and-A article, Packaging Specialist Schommer answers a most comprehensive array of plant-practical food-packaging problems.

The pertinent questions were drawn up by members of the Packaging Institute. And they were "taken in stride" by Mr. Schommer in a special production seminar which proved a highlight of the Institute's recent New York City meeting.

MAINTENANCE

1—Is the packaging line-servicing crew under the control of the plant maintenance group? Or is it responsible to the supervisor of the packaging line?

A—This crew is under control of the plant maintenance superintendent. However, these service mechanics do work in close cooperation with production department supervisors.

Steady day mechanics and day-shift mechanics are responsible to the packing floor maintenance foremen. And the second- and third-shift mechanics are under the direction of the shift-production foreman.

Day mechanics handle all major overhaul jobs, new installations, and special development work.

2—Do you recommend that operators of each packaging line make minor repairs?

A—Definitely not. Line operators have enough to do without making minor adjustments or repairs—work which should be done by the shift mechanics. Moreover, if responsibilities are spread too thin, there is too much opportunity for buck-passing, especially when production falls off.

Also, it would be difficult to spell out what should be considered a minor adjustment or a minor repair. Before long, operators would be attempting adjustments or repairs

that they are not capable of doing. Consequently, heavy production losses would be encountered.

3—Do you allow a time factor in changing over specific equipment from one product to another, or from one size container to another?

A—Yes. We have analyzed the various steps necessary in changing over a line from one product to another. When changeovers take place, each operator has a specific duty to perform, such as changing cartons, moving remaining product to supply bins, blowing down scales, and changing them if necessary. At present, about 3-5 min. are required to make the switch.

At this time, only one line is periodically changed over from one size container to another. And we know fairly accurately how many man-hours are required to do it. For example, changing a high-speed Pneumatic Scale bottom sealer from one size package to another takes approximately 22 man-hours.

4—Do you recommend a definite procedure for mechanics to follow when changing over equipment?

A—The type of equipment determines the procedure. Usually, the equipment manufacturer issues a set of instructions, listing the order in which the steps should be taken in making change-overs.

Of course, after experience has been gained in changing over a unit, it is possible to find ways of reducing the change-over time. However, a fairly standard procedure should be followed.

5—Does your setup time allow for the necessary final adjustments on an automatic line?

A—Not specifically. A mechanic stays with the line until it is running at normal speed and turning out satisfactorily packaged products.

6—Do you have a training program for your mechanics? And if so, how does it operate?

A—Yes. New men are taken in on a plant-wide, open-bid basis. No tests or formal prerequisites are required, but those men with obvious or known shortcomings are disqualified. To date, this system has not presented problems, and it has enabled us to secure individuals who have later turned out to be good mechanics.

Successful bidders start as helpers under first-class day mechanics. These bidders are encouraged to attend trade-school classes to improve themselves outside of regular working hours. Next step is a trainee (second-class) under a shift mechanic. Progress from helper to trainee, to shift mechanic, to first-class mechanic depends upon job openings and the individual's qualifications, which are determined by the maintenance supervisor.

Improvement can be made in our setup by the use of screening tests and by a more formal training program.

PREVENTIVE AND CORRECTIVE MAINTENANCE

7—Do you have both preventive and corrective maintenance programs? And how do you segregate them?

A—The biggest factor in our maintenance program is a partial overhaul of the line once a year. In addition, we make a complete overhaul, taking each line down every three years.

Our maintenance program also comprises intelligent oiling of equipment, adequate training of shift mechanics, periodically inspecting machines by the maintenance supervisor, and closely cooperating with operating supervisors.

A daily log is kept by shift mechanics, who report minor repairs and service work, along with suggestions and recommendations. Each morning, the maintenance foreman reviews these reports and checks each machine's performance with the operating supervisor to make sure that the lines are running satisfactorily. The foreman records his findings and uses this information in setting up a work schedule for mechanics on Saturdays when the lines are usually down. And, at this time, major repairs are made.

8—Does your maintenance program require operating personnel to report in writing or verbally on minor faults with machines? When do you correct these difficulties—after the line has shut down for the day, at a prescribed period, or during change-over time?

A—The shift inspector makes scheduled inspections of all lines, checking all phases of operations. He inspects code-dating on packages and shipping containers; products for color, volume and weight packaged; and machines for cleanliness and performance. He also makes a continuous general inspection of all packaging operations and package fabrication.

A form is employed by the shift inspector for reporting these checks. Abnormal conditions are reported to the shift supervisor, and the written report is issued to the supervisor after each shift.

The shift supervisor also prepares a report, indicating reasons for losses in production and making recommendations for improving packaging performance. This report is reviewed daily by the packing-floor superintendent and maintenance foreman. If minor faults affect the quality of the package or reduce output, they are immediately corrected.

If, for example, liners are poorly sealed or if the top fold is not correct, then machine-adjustments are immediately made. On the other hand, if the trouble is not serious, it is corrected on down-day, which is usually a Saturday. However, this difficulty is checked daily by the maintenance foreman to determine whether or not it is becoming serious.

9—Do you have a program for completely overhauling machines? Is it done periodically? Is the overhauling job determined by conference between operating and maintenance departments?

A—As stated, we attempt to overhaul a line every three years. But the big problem is to coordinate the workload of the maintenance crew with production curtailment to secure the necessary downtime.

Decision to overhaul equipment is usually determined by conference between operating and maintenance departments. If mutual agreement cannot be reached, then the maintenance department should make the decision.

BUDGET AND RECORDS

10—Do you have a maintenance budget, and do you keep records of the cost of repairs?

A—We do not have such a budget. However, we do have a plant maintenance budget which includes the packaging mechanics. These mechanics spend all their time in the packaging department, and their time is charged against this operation.

Through study and experience, we have determined the number of mechanics required to maintain equipment. Therefore, the total cost remains fairly constant. However, a record is kept of time spent on packing-floor jobs by company mill wrights, electricians, sheet-metal workers, and pipe fitters.

Where general plant mechanics service packing-floor equipment, along with processing units, a maintenance budget should be set up to determine packaging machinery costs vs. other equipment costs.

Parts for packaging equipment are not budgeted. These figures are determined by experience and stockroom control records. However, records are kept of major repairs, changes, and overhauls for each machine. Information includes work done and man-hours involved.

11—How do you go about studying excessive downtime on machinery during operations?

A—Daily shift records are kept of all downtime on lines. These reports are analyzed daily by the maintenance foreman and packaging department superintendent, who set about making immediate corrections.

If the packaging department has bogged down for any appreciable time, an observer is assigned to check and analyze excessive downtime to determine the causes.

12—Does your mechanical force check the lines after each day's production?

A—Most of our lines operate around the clock. After reviewing operational and mechanic's reports, the maintenance foreman, along with the shift supervisor, inspects the operation of the lines every morning. Considering all findings, he sets up a schedule of work for day mechanics. And by the end of the week, he will have a Saturday schedule for those mechanics who are brought in on the day shift. This includes first- and second-shift mechanics. Third-shift mechanics are not held over.

MECHANICS' RATING AND PAY

13—Do you have more than one rate of pay for your packaging-line mechanics? What factors do you use in setting up these job classifications?

A—Our job classifications are: First-class mechanics (day mechanics), shift mechanics (work around the clock), and trainees or helpers.

In arriving at these classifications, we determined how much servicing the equipment required to keep it in A-1 running condition. It was also necessary to learn how much preventive maintenance was needed. Once this information was available, we decided on the following maintenance setup:

First, the majority of our lines run 24 hr. a day and 5 or 6 days a week. Therefore, it was necessary to use shift mechanics, whose main duties are to keep the line in operation. These mechanics should be able to adjust and regulate all machines to insure properly timed lining of cartons, packing, wrapping, and sealing operations. They must have a thorough working knowledge of handling packaging materials and products through fillers, hoppers, and other equipment. And they must also be able to work with or on any material required in servicing packaging equipment.

Second, we learned that our shift mechanics do not have sufficient time to do major overhaul and repair work and to install and remodel complicated packaging machinery. Consequently, we use specialized mechanics with a greater degree of skill for these jobs.

Trainees or helpers are put on whenever we feel it necessary to expand our force due to the addition of more lines, or when more mechanics are needed to keep the equipment in tip-top condition.

14—Do you recommend placing the mechanic's workshop adjacent to the packaging lines?

A—The closer the better. There is no question that excessive downtime can be eliminated by having the workshop close to the packing floor. The shop should be large enough to house the necessary equipment for repair work, and it should also be well-lighted.

Our Chicago-plant setup is ideal. The 18x36-ft. shop is on the packing floor proper. Equipment consists of a 9-in. lathe, drill press, grinder, band-type hack saw, both electric and acetylene welders, standard hand tools, benches, and cabinets.

15—How do you summon mechanics when you have a line breakdown?

A—Over each line is a colored light that is hooked up to a bell system. When a line breaks down, the operator switches on the light and rings a bell for the mechanic. Two rings might be for a paper man, three for a mechanic, and four for a glue man.

16—Do you consult your mechanical maintenance group when ordering new equipment?

A—General Mills, Inc., has three cereal plants packaging the same products. Usually, when new equipment is to be ordered, the final decision is made by the Cereal & Package Foods Manufacturing Superintendent, who is in charge of all three plants. In most cases, the plant maintenance groups are not too familiar with other types of equipment, outside of the machines in operation at their plants. However, the maintenance groups plan for purchasing new equipment, and their suggestions are always considered.

EQUIPMENT

17—What tolerances do you allow when filling free- and non-free flowing products?

A—There are many variables in weighing operations that could alter tolerances in different plants, even though comparable product and equipment are considered. For instance, variations in the speed of the weighing machine will affect the weight ranges. So, too, is the condition of the weigher. What's more, the method of handling a product directly above the weighing unit also can affect weights.

A free-flowing, granular material is easier to weigh and control than a non-free flowing product, when both are handled at the same speed. Therefore, any deviation from the standard should be less with the free-flowing item.

Our weights are guided by the Pure Food, Drug & Cosmetic Law.

We have installed a statistical weight control system that assists us in determining our realistic tolerances. A control-chart method is also employed to inform us if a packer is delivering weights within those limits. Maximum possible uniformity in weights is thereby obtained from each machine.

18—How do you fill a powdered product with a 15 percent fat content?

A—We do not handle powders, but we do package products with a fat content higher than 15 percent. Such items are handled by Pneumatic Scale gross-weight units with two or three filling stations.

Although the type of filling equipment is extremely important, control of the product ahead of the filler is more important. Some high-fat content foods must be fed to the scales in a stream, with no head or storage ahead of the scales. Packing of such material will hamper the operation of the fillers.

Some products with a fat content below 15 percent can be binned. However, the head of such products immediately above the scales must be controlled so that they function properly. Uniform distribution of products to the filling unit is necessary for it to operate properly.

CONTROL OF PACKAGE FILL

19—Do you control checkweighing immediately after filling or after sealing a carton?

A—Checkweighing should be done after filling. If weights are off, then packages and product can still be salvaged. In some plants, an operator corrects deficiencies in weight by either adding or removing product from the package, which is then fed onto the line. Others dump products into containers and then feed them back into the scales.

If packages are sealed, those that are under- or overweight must be opened to salvage the product, while the package is non-salvagable.

20—Is the use of automatic checkweighing equipment practical?

A—It is for cake and pie-crust mixes, where any deviation from the stated weight will affect the finished product prepared by the housewife according to recipe. Such checkweighing is also practical for expensive materials, especially if the overweights are consistent. Giving away expensive product in this manner could run into large sums of money.

21—What are just rejection allowances for using folding cartons and carton-lining paper on automatic packaging lines?

A—For both folding cartons and lining paper, 1.5 percent.

22—A processor poses this one: "We have an automatic carton sealing and filling line on which bottom flaps are sealed against a block and top seals by a pressure belt. Our bottom-flap seals are satisfactory, but the top ones are not. What can we do to improve the top-flap seals?"

A—All top sealers operate on about the same principle. There is possibly something wrong at the point where the cartons are transferred from top sealer to compression belt. If the cartons are not squared up properly when entering the compression dryer, then the flaps will shift.

Another point to check is the type of adhesive being used and the length of the compression belt.

SIZE RANGE AND EFFICIENCY

23—What range of package sizes should a fully automatic line handle?

A—A line should handle a good range of sizes, in the event of changeovers. A packaging line, however, should not be used for more than two sizes because of the downtime. Resulting lost production builds up rapidly if the line must be shutdown for changeovers every few hours or days.

These changeovers should be spread out over as long a period as possible. In the event the equipment can be changed over quickly, it is then possible to run more sizes economically. This can only be determined by experience and study of lost time and production versus buying another line and then switching the crews from one line to another.

24—At what rate of efficiency should a carton machine operate?

A—It depends upon the standards set up. In our case, we set a standard of 60 cartons per minute per line (actual production). This rate was established by taking into consideration the time required for oiling, changing paper, and making minor adjustments.

Actually, the line operates, in most cases, at 70-72 cartons per minute. The 60-per-minute figure can be maintained a good percentage of the time and yet keep the operating personnel hustling to make this quota on a day-in and day-out basis.

If you set your standard too high so that it can only be attained under perfect conditions, then it will have a bad psychological effect upon the personnel. Using 60 packages per minute as a standard with our equipment, we find that our lines operate at 95-100 percent efficiency.

25—How are standards established to determine line efficiency? Do you use an equipment manufacturer's blurb, or do you determine your own standards?

A—We stick close to the manufacturer's rated speeds. Most of our equipment is rated for 60 packages a minute, and our standard production quota is set at this figure. This means that our lines run at 70-72 packages a minute.

In setting standards for line efficiency, one must consider the nature of the product and package. Free-flowing products with uniform density can be handled by volumetric feeders at higher speeds than non-free flowing items or materials with varying densities. The latter two products require net or gross weight machines.

If the carton requires a liner, it is doubtful that liner-forming units can run at speeds higher than those rated by the manufacturer and still produce a satisfactory amount of liners with good side seams and top and bottom folds. However, if liners are not used, higher speeds can be attained.

Factors to consider in setting up standards are type of product and equipment, use of carton liners, and length of operating time (8- or 24-hr. day).

26—What must I do to get the best efficiency out of my packaging line?

A—First, maintain your equipment in A-1 condition by: (1) Employing well-trained mechanics, (2) using a preventive and corrective maintenance program, (3) setting up a suitable lubricating schedule, and (4) overhauling the machines periodically.

Second, use the proper type of adhesives to prevent carton and production losses.

Third, purchase the proper type of cartons. Issue specifications to suppliers and make them adhere to them. Poor fabrication of cartons—cuts, tears, warps, and poor scoring or prebreaks—will greatly influence production.

Fourth, thoroughly train your operators.

27—Do you keep records of downtime on your equipment? Do you employ recording devices or ring a bell when a machine shuts down?

A—Downtime is recorded together with the reasons after each shift. It is recorded on the operating foreman's production report, which is reviewed daily by the packaging superintendent and packaging maintenance foreman.

At present, we do not have recording devices, but we soon plan to experiment with them.

We have no alarm system for a line when it stops. As stated, the line operator uses the light and bell system.

TRAINING PACKAGING PERSONNEL

28—Do you have a training program for packaging line personnel and line supervisors?

A—New personnel for the packaging lines are turned over to the inspector-trainee, who spends 90 percent of her time training them. Depending upon how fast the trainee learns the operation, the inspector-trainee devotes 2-3 days on instructing and demonstrating the proper methods. When satisfied that the trainee is capable, the instructor then informs the supervisor. After personally checking on the ability of the trainee, the supervisor finally qualifies her.

Incidentally, a record is kept of all packing operators, listing the jobs for which they are best qualified. This record is valuable when crews are to be shifted due to changes in production requirements.

New packing-floor supervisors are assigned to regular supervisors for about 30 days. After this period, they become assistant supervisors.

Our personnel department also sets up supervisory training courses for all plant supervisors.

29—How do you decide what operators to assign to machines on an automatic packaging line? Some companies are always arbitrating with the union on this problem.

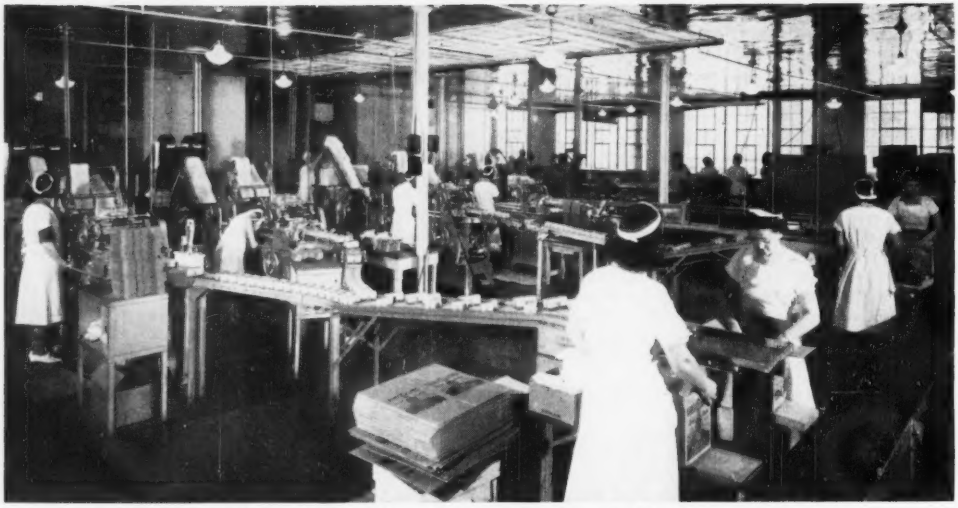
A—Seniority and qualification are the principal factors. However, we have found very few of our personnel who are not capable of becoming efficient machine operators, provided they are properly trained. Where unions and seniority are involved, there seems to be no other approach.

SELECTING EQUIPMENT

30—What factors do you consider when purchasing new equipment?

A—Eight factors are considered: (1) ability of the machine to produce the package desired; (2) flexibility, particularly when various size packages must be turned out; (3) ease of changeover; (4) popularity of the machine (check with other users to learn their experiences); (5) speed (determine if the rated speed of the machine ties in with your ability to supply it with product); (6) floor space requirements are important, especially if your space

(*Turn to page* 201)



From Bulk (Rear) to Carton (Foreground) Takes But 3 Min. at Land O' Lakes

SPEEDIER BUTTER PACKAGING

HIGHLIGHTS: Automatic conveyors whisk quality product to cutting, packing, wrapping . . . Company "tailored" the special print-unit feeders, patty-slab mover

FE STAFF

"When truckloads of butter from over 400 creameries start hitting our receiving platform like so much buckshot during the flush season, that's when things really start to hum in my department."

. . . It's Pat Casey talking, supervisor of the print room at Land O' Lakes headquarters plant in Minneapolis. And Pat is simply making a modest statement of fact, for he's at the helm of what is perhaps the largest one-room butter packaging operation in the world.

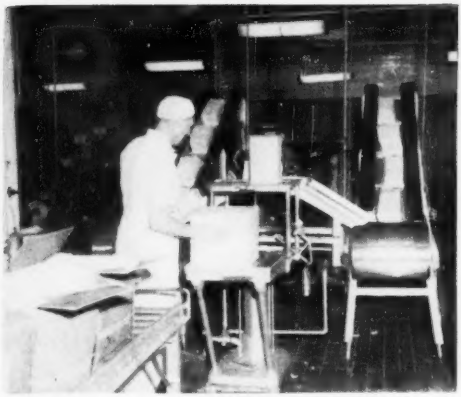
Four packaging lines rapidly dispose of incoming butter. Two lines form ¼-lb. bars, then wrap and package them in pound cartons at a rate of 8,000 lb. per hour. The third line delivers solid 1-lb. packages at 3,600 per hour. And the fourth puts up 5-lb. units of patty slabs at 2,100 lb. per hour.

All told, when things are thus humming, more than 13,500 lb. of packaged butter funnels from the room each hour. And only 3 min. elapse between the unboxing of bulk butter and its enclosure in the consumer package ready for delivery to stores.

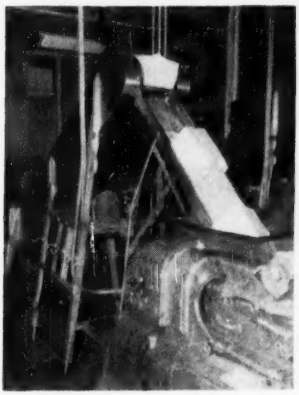
1 **BULK BUTTER,** from member creameries in state and western Wisconsin, arrives at Minneapolis printing plant by truck (some, too, by rail).

2 **GOVERNMENT INSPECTORS** grade output of each churn for color, body, taste and smell, then place sample in sterile bottle for lab tests.

3 **BUTTER** grading 93 or better goes on roller carrier from cooler to elevator (rear), thence onto conveyor in 2nd floor print room.



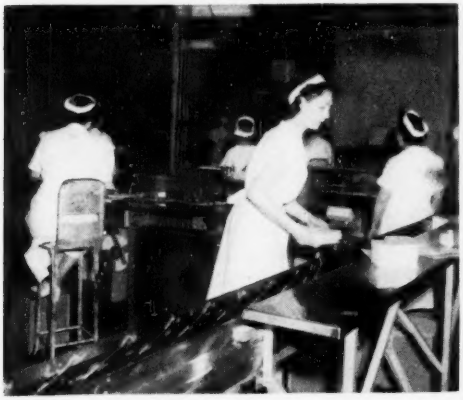
4 **CARTONS AND WRAPPINGS** are removed from the 64-lb. blocks of butter, then automatic cutter separates each block into 16-lb. rectangles.



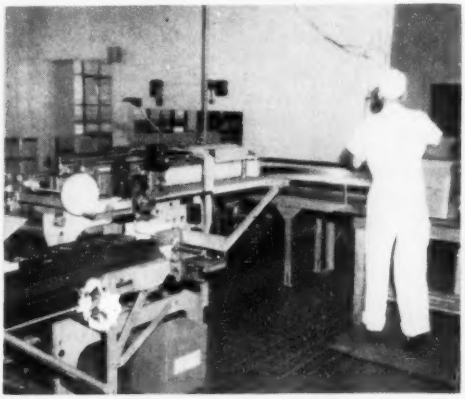
5 **COMPANY-BUILT ESCALATORS** supply butter to chutes that feed printers. Microswitch feelers control escalators to keep chutes filled.

6 **MORPAC PRINTERS** form and wrap individual rectangles (both ¼- and 1-lb. sizes) and automatically fill the familiar 1-lb. cartons.

7 **FILLED CARTONS** are packed (32 to a corrugated container), then case is sealed and chuted to cooler on floor below.

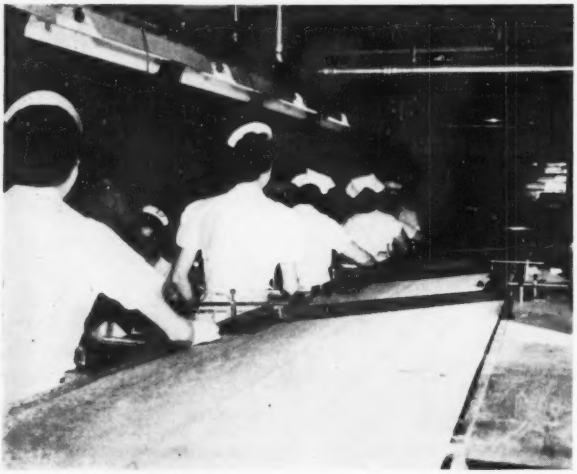


8 **EMBOSSED PATS** in four sizes (48, 60, 72, and 90 per ⅓-lb. slab) are made on But-R-Cut units. Slabs are stacked 15 high on company designed conveyor.



9 **AUTOMATIC WRAPPER** (Gellman) seals 5-lb. stacks of pats in wax paper. Cartoning follows, then packages go down chute to storage below.

Innovations Simplify and Speed Packaging



BAFFLES direct proper quantity of candy to packaging stations as pieces move along wide conveyor belt. Girls slide candy across chute to dump-type weighing pan on scale platform.

WEIGHING PAN is mounted on pivots directly on scale. Girl slips bag over spout and tilts pan to quickly fill bag.

Kroger Teams Management, Methods, Equipment for—

Better Than Machine-Made

Productivity improved in multi-product candy department by longer runs, packaging innovations, continuous mixing, unique cooler, high-speed units

NORMAN BEATTY
Candy Production Superintendent,
The Kroger Co., Cincinnati

Engineered and managed for efficiency, the candy department of The Kroger Co.'s Cincinnati plant produces as much as 40,000 lb. of hard candies a day, plus large quantities of chocolate-coated items, marshmallows, and caramels.

Modern high-speed precision production machines and advanced packaging methods account for much—but not all—of the high capacity and efficiency. Advanced engineering and wise management have teamed up to establish a base upon which better than machine-made efficiency can be attained.

By installing automatically controlled refrigerated rooms, the engineers made it possible to store many candy items for long periods without quality deterioration. Seventy-five to 100 thousand cases of candy can be held under refrigeration at a closely controlled temperature of 65 deg. F. and a relative humidity of 50 percent.

Kroger has found it desirable and advantageous to store a wide variety of chocolate enrobed candies—particularly those which mellow with age—and also the high-boiled unsanded hard candies. Candies which undergo chemical and physical changes without moisture loss cannot be stored long.

The large storage facilities have enabled management to spread its production throughout the year and to greatly extend the period during which even a seasonal item is manufactured. But more about this later. First, let us list the outstanding advances in the Kroger candy operations:

- **More efficient scheduling of production of the various items**
- **Continuous use of trained and skilled workers**
- **Air conditioning of manufacturing space**
- **Unique ceiling-mounted hard-candy cooler**
- **Controlled conveyor flow of candy to packaging stations**
- **Scale-mounted tilt-type measuring and filling pans**
- **High-speed forming and embossing machines**
- **Continuous marshmallow mixer**

All of these advances work together to enable Kroger to turn out a variety of quality confections in attractive packages which meet the demands of self-service stores for eye and taste appeal at a reasonable price.

Kroger's production schedule formerly followed the conventional pattern. The plant would go all-out on a certain item for a relatively short time. This meant quick hiring of unskilled and unpracticed workers to man the production lines. Then just about the time the green workers became proficient in their jobs, the run was finished. So many of the employees were released and the advantages of their proficiency lost. This type of operation also meant that production

GADGET speeds packaging of chocolate-cherries. Nested paper cups are held in jig to free operator's hands.

Efficiency

equipment stood idle—and was not paying dividends—a large part of the time.

Now short-haul pell-mell production is out. With the aid of the refrigerated storage facilities, management carefully schedules production for longer runs on each item and for year-around operation. This gives steady work to a solid core of capable employees, who develop a high degree of productivity and never loose it through extended layoffs. Both the company and the employees benefit tremendously.

To illustrate how this works out, take the production of chocolate-cherries. This last summer the plant planned a 10-week run on this product, the time being based upon last year's performance. But the higher productivity of the workers, plus improved methods, chopped 11 days off the schedule. Each girl on the packing line was expected to fill 600 of the 1-lb. window-boxes a day. But many of the girls came close to 1,000 a day.

Improved packaging methods and equipment have supplemented worker skill in speeding packaging. These are exemplified in the chocolate-drop operation. Coming from the depositor and enrober, the drops are carried on a 2½-ft.-wide canvas belt to packaging stations alongside the belt. To speed the work at the packaging stations, the chocolate drops are guided to each girl by adjustable stainless steel baffles set at an angle of about 45 deg. to the conveyor. These baffles crowd the drops across the belt to a position directly in front of each packaging station. There they are within quick, easy reach of the girls.

The baffle at the head of the belt takes chocolate drops from the inside of the belt—a strip about 6 in. wide—to supply the first packaging station. The second baffle peels off a second 6-in. strip for the second packaging station. And so on, until the fifth baffle takes the remaining strip of candy on the far side of the conveyor. The last baffle usually is adjusted to take a little less candy than the others. So the girl at the last station need not let any candy go by her.

Two girls work as a team at each packaging station. One pulls the candy off the belt, onto a stainless chute, and into a little stainless steel pan that is pivot-mounted directly on a platform scale. The girl puts enough pieces into the pan to zero the scale, quickly slips a bag over the spout of the scale pan, and tilts the pan to dump the weighed candy into the bag. Kroger uses both single- and double-walled cellophane and polyethylene bags, depending upon the item and type of protection desired.

As the worker fills the bags, she

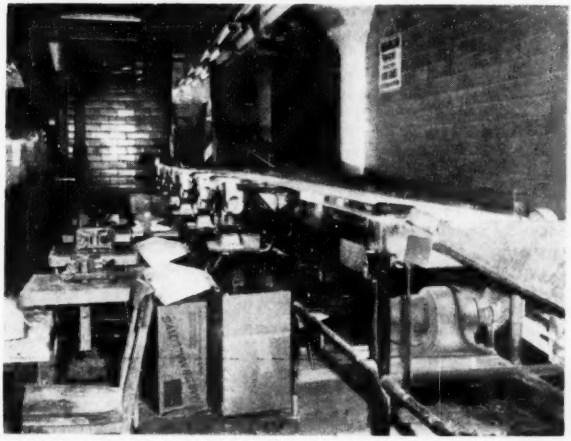
DON'T SKIP IT IF—

You have problems involving:

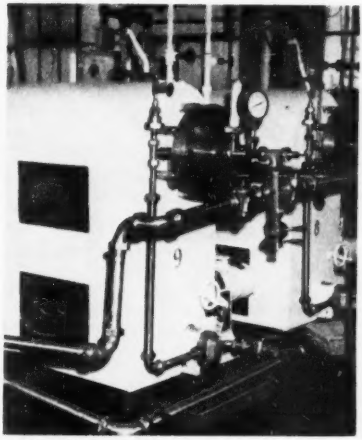
Seasonal Operations
Manual Bag Filling, Sealing
Air Cooling Product
Continuous Mixing
Forming Small Pieces
Wrapping Cubes

For this article reveals advanced practices that may be useful in your branch of the industry.

Advanced Marshmallow Making and Packaging

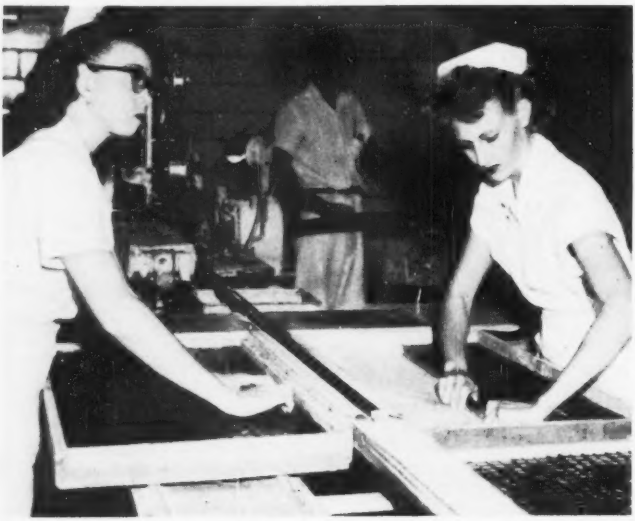


PACKING table carries marshmallows to six packing stations. Teams of girls weigh, dump into bags, heat-seal bags, and case them. Small return conveyor recirculates excess flow on main belt.



CONTINUOUS Oakes mixers produce uniform-quality marshmallow at high capacity and with saving in labor.

Big-Little Caramel Line



TWO MACHINES and three workers turn out 2,900 lb. of cellophane wrapped caramel cubes per 8-hour shift.

places them into a four-channel rack from which they are picked up and heat-sealed by the second girl on the packaging team. Sealing is done by a foot-operated unit with electrically heated jaws. And the sealed bags are placed, by the same girl that does the sealing, into shipping cases.

When this improved packaging operation was devised, production was rated at 825 cases in an 8-hour day for five teams of two girls each. But the output is running closer to 900 cases a day.

This operation not only has the attribute of high efficiency, but it eliminates unsightly scoring of the delicate chocolate drops—a problem formerly encountered with an automatic filler.

Marshmallows also are packaged efficiently by a similar set-up. Six teams of girls fill the bags and heat seal them at stations alongside a 2½-ft. canvas belt conveyor. Marshmallows from two Moguls on the floor above are discharged onto the receiving end of this packing table. And three of the packaging teams can handle the 12,000-lb.-per-day (8 hr.) output of one Mogul.

There is, however, an innovation on the marshmallow packing table. It is equipped with a 6-in.-wide return belt which recirculates any marshmallow pieces that get by the last packaging station.

Other advanced equipment also is used in the marshmallow department. outstanding are the two continuous Oakes mixers for making the marshmallow. These have high production capacity (12,000 lb. per day each), produce a product of high and uniform quality, save labor and simplify sanitation.

For further efficiency in the department, the Moguls are equipped with automatic tray stackers.

Chocolate-Cherry Trick

Packaging of chocolate-cherries in crimped paper cups has been greatly facilitated by an ingenious device. It consists of two holders for nested cups, permitting a girl to pick up a piece of candy with each hand simultaneously, put the two pieces into the top cups in the nests, and, by a flick of the wrists, remove the two cups and candies from the holder and place them in the candy box. Rubber finger stalls provide enough friction to pull the cups from the nests.

This gadget just about doubles production, because the girls formerly held the nested cups in one hand and picked up candy with the other.

The paper cup holder, or jig, consists of two 2-in. pipe couplings soldered to a slanted galvanized iron base and lined with ¼-in. sponge rubber strips inside of which the nested cups are set. The jig also has a shallow galvanized iron tray into which the candy box is placed to hold it in a convenient position.

Compact Caramel Line

One of the neatest candy operations at Kroger is the caramel line. Here three workers and two machines produce 2,900 lb. of cellophane-wrapped caramel cubes per 8-hr. day, with two shifts doubling that output.

Caramel in rope form feeds into the conical hopper of a Baker-Perkins sizer, where rotating ribbed rolls move the candy downward to a set of serrated rolls which form a 1x2-in. rope. This size is further reduced by half in another set of rolls, then the rope goes into a Rose cutting, forming and wrapping machine. The formed and wrapped cubes are discharged onto a narrow conveyor. Two girls, one on each side of the conveyor, quickly lift a row of caramels from the conveyor and place the candy into large paper-lined wood trays for subsequent packaging.

Ceiling-Mounted Cooler

Most recent innovation in the efficient hard candy department is a new ceiling-mounted cooler. Designed by Kroger, it consists of a 250-ft., multi-level wire-mesh conveyor mounted on an angle-iron frame and extending the entire length of the candy department. Providing a 20-min. travel, it cools 4,000 lb. of candy an hour continuously. And no air blast is needed, since the cooler is in an air conditioned room.

Elevating flight conveyors lift the candy onto the cooler at one end. And the candy discharges after cooling via a pull-down chute at the end of the bottom run near the center of the cooler. Eventually, the chute will be arranged to take candy off any part of the belt.

Sizable benefits have come from the installation of this out-of-the way, continuous, large-capacity cooler. It saves all the time, work and floor space formerly involved in cooling the hard candy on wire racks in portable bins which cluttered up the floor of the department.

High-Speed Machines

Well engineered, high-speed dependable sizing, forming, and embossing machines play a big part in efficient volume operations in the hard candy department.

One of these puts hard candy on lolly-pop sticks at a rate of 200 a minute. Coming from the spinner, the warm, soft, candy rope passes through sizing rolls and is cut into pieces by a fast cam-actuated knife. Each piece drops into one of 10 U-shaped chambers on a revolving turntable. Cam actuated plungers then push one piece at a time into a die pocket on a second revolving table. Finally, slide cams push the plungers down to form the pieces into "pops".

Meanwhile, sticks automatically feed into cross grooves on a horizontal drum

and are dropped, as the drum rotates, into holders. Then they are automatically pushed forward ½ in. so that the end of each stick is in a pop die chamber when the candy is die-formed.

Next, a rotary disk with cam-actuated grip-plates underneath picks up the end of each stick and tosses each pop from the forming die to a conveyor.

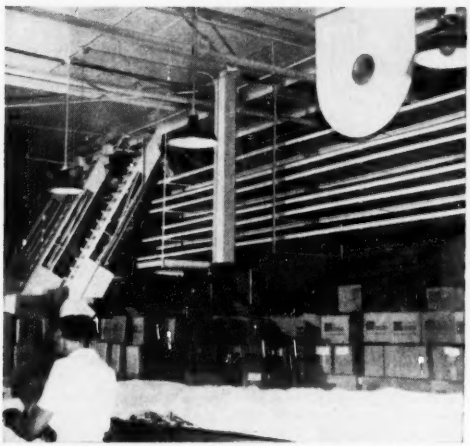
Embossed circular hard candies, with solid or filled centers, are knocked out at a rate of 900 lb. per hour for the solid and 750 lb. for the filled. After leaving the spinner and passing through sizing rolls, the candy feeds between two superimposed chains with cupped links. As the chains come together, the candy is cut into pieces which are carried between the chains in the cupped spaces. Then cam-actuated plungers held in slides that travel with the top chain are pushed in to form the candy into shape and apply the embossing design.

Embossed bar-shaped pieces of hard candy are produced at high speed on a third type of machine. One of these units, with a 6-roll sizer, has a capacity of 1,500 lb. an hour. Another, with a 3-roll sizer, does 600 lb.

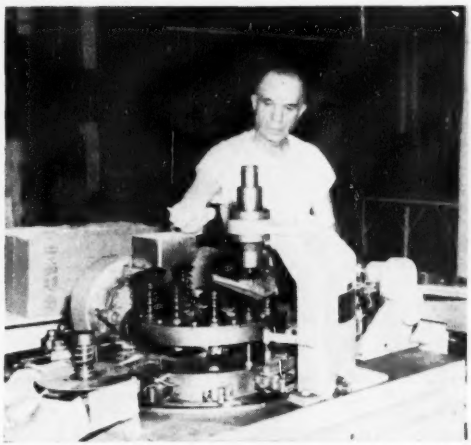
Candy from the spinner feeds through the sizers—vertical U-grooved rolls in pairs—into a former-embosser consisting of a pair of endless chains. The links in the chains carry the embossing design. And as the candy goes between the chains the superimposed links cut it into pieces, form the pieces into flat bar shape, and apply the design.

The pop machine is a Latini made by Chocolate Spraying Co., also the manufacturer of the unit that forms and embosses the circular hard candy pieces. The bar-chain molder is a Hohberger Mfg. Co. unit, and the 6- and 3-roll sizers are Cottrell machines.

Overhead Hard Candy Cooler and Pop Machine

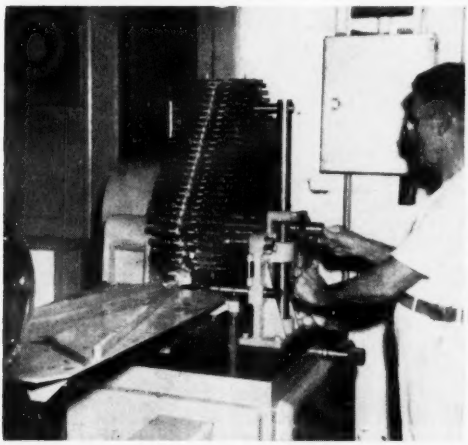


NEW COOLER designed by Kroger handles 4,000 lb. an hour to save labor and hangs from ceiling to clear floor space. It is loaded by elevating flight conveyors.

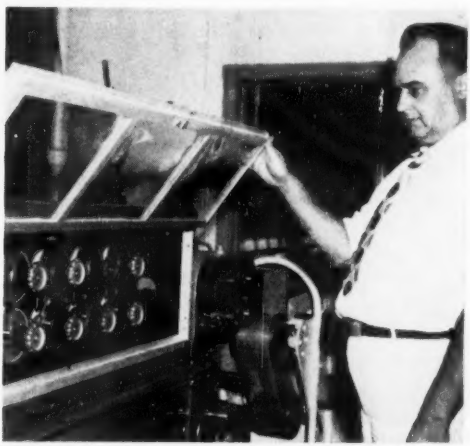


200 A MINUTE is the production rate of this machine which automatically die-forms "pops" on sticks and removes pops from dies.

High-Speed Hard Candy Automatics



ROUND PIECES of hard candy are formed and embossed by a double endless-chain arrangement of forming pockets and cam-actuated plunger dies.

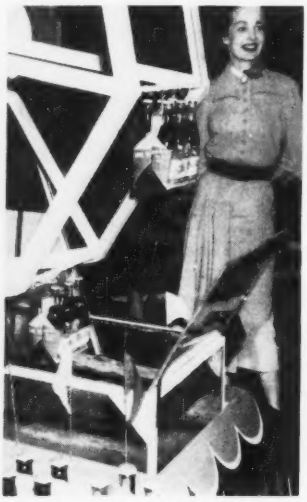


EMBOSSED BAR pieces are made quickly as 6-roll sizer feeds rope of candy between endless chains with flat embossing links. Author examines sizer.

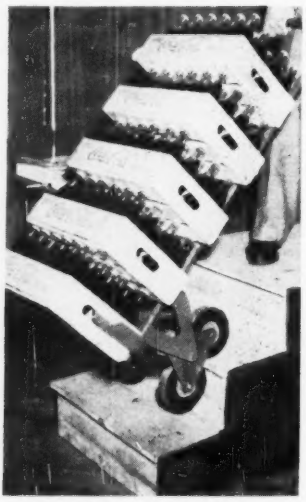
Latest Units Viewed by Bottlers

ABCB Show Sparked by Many New Developments

24-BOTTLE CARRY-HOME case of 90-to-100 point, 4-ply, laminated, bleached or unbleached kraft was displayed by Gaylord Container Corp., St. Louis. Has divider-handle. Comes flat for setup by stapling. (86A)



WATER RESISTANCE of 6-bottle plastic-coated carry-home carton was demonstrated by continuous ferris-wheel dunkings. Better appearance, greater rigidity, longer life are features.—Atlanta Paper Co. (86B)



HAND TRUCK rolls up or down steps on rubber-tired, ball-bearing "Roto-Wheels." On level, it operates on or 4 wheels. In climbing, whole series of wheels turns.—World Wide Sales, Inc., Chicago. (86C)

NEW PALLET-TRUCK BODY, with hinged doors that slide back into the individual compartments to facilitate loading and unloading filled pallets, was exhibited by Herman Body Co., St. Louis. Also shown by this company were new low 5-case-wide enclosed bodies and easily accessible cabs. (86D)

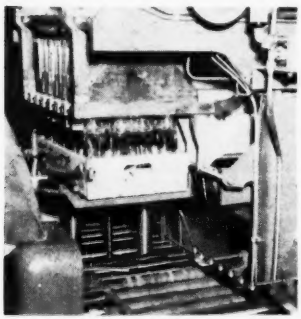
IMPROVED LUBRICATOR for conveyors, shown by Oakite Products, Inc., New York, comprises rotating drum with 8 dispensing cups. (86E)

PACKER for cartons or half-depth cases deposits single row of 6 bottles, then moves case to receive other rows. Capacity: 160 bpm.—Bottlers Appliances, Inc., Salisbury, N. C. (87A)

GLASS-ROVING honeycomb filter was exhibited by Commercial Filter Corp., Boston. Also shown: Filters with synthetic fibers, and one with decolorizing carbon. (87B)

WATER TREATER produces electrically charged metal hydroxides that coat sand in filters and adsorb impurities. Shown by General Hydro Co., Washington, D. C. (87C)

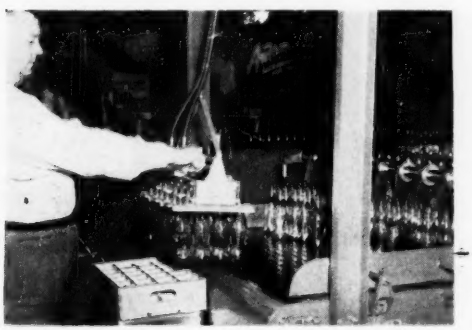
Newest in Casers, Uncasers, and Soaker Loaders



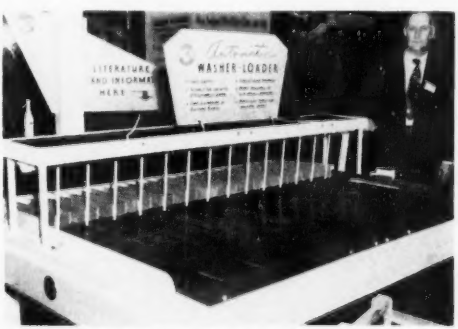
AUTOMATIC UNCASER. Fingers grab bottles and deposit them on conveyor. Unit operates with half- and full-height cases.—Standard-Knapp Div. of Emhart Mfg. Co., Portland, Conn. (87D)

CASE UNLOADER removes bottles during travel through unit, places them on washer feeder. Discharges cases on either side.—Radio Corp. of America, Camden, N. J. (87E)

GRIPPER for manually removing bottles from half-cases was displayed by Bottlers Appliances, Inc., Salisbury, N. C. Model shown lifts 2 rows of 6 bottles. (87F)

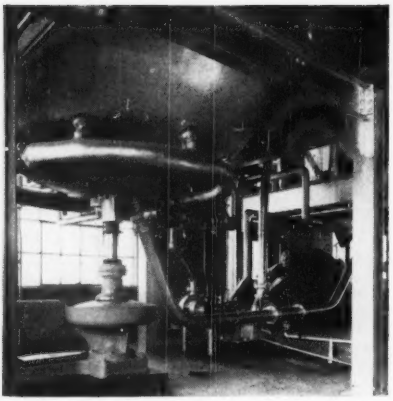


SEMI-AUTOMATIC uncaser has air-actuated head that grasps 24 bottles, then lifts and deposits them as unit on feed table.—Standard-Knapp, Portland, Conn. (87G)



WASHER-LOADER, for use following automatic or manual uncasing, arranges bottles in files, then feeds them into washer channels—Radio Corp. of America. (87H)

Want additional information about any of the items shown in this picture article? Just circle the key number (in parentheses at end of each caption) on the Reader Service coupon adjacent to inside back cover. Then drop it in the mail—and complete data will be sent you directly.



CHANGED was arrangement of stainless steel cooker. Kettle was installed so the bottom (right photo) is exposed on floor below to provide access to pumps, agitator, and steam manifold, with sufficient space and lighting.

THREE P's TO PROFITS

Product (Bettered) . . . Plant (Modernized) . . . Promotion (Intensified)

Gulf Brewing's sales skyrocketed over 40 percent in 1950 —when industry sales declined. Brewmaster tells plan and action of triple-pronged effort that chalked up big gain

CHARLES E. LIEBERMAN
Brewmaster and Plant Manager,
Gulf Brewing Co., Houston, Tex.

In December 1949, after a provocative period of teaser advertising, our organization, Gulf Brewing Co., introduced a brand new beer to the Texas market.

This step—necessitating a complete revamping of our process at a time of declining sales—was drastic. Yet the fact is that it strikingly "turned" the shrinking market of the previous years.

■ **Our first year with the new beer witnessed a 40 percent increase in sales. And our current '51 figures show a continued rise.**

How was it done? It would be simple to toss out a pat answer, such as "the new beer was completely winning," or some other over-simplified phrase that would curl the lips of the knowing brewer. Truthfully, however, having a good new beer is only part of the reason when such a strong increase is achieved in this highly competitive field. Let us go deeper into the factors:

Actually, there was a threefold upgrading behind this success—a triple effort drawing on the energies and talents of all members of the brewery's production and sales teams. It can be briefed like this:

1. *A Better Product.* We went from a dark, heavier tasting brew to a pale-dry beer that is lighter, milder and more subtle in flavor.

2. *A More Efficient Plant.* We expanded and modernized to take advantage of the most advanced technics in our new process.

3. *A Successful Promotion.* We placed great emphasis on the intelligent introduction of our new beer via an extensive "ad" campaign.

THE PRODUCT

Paradoxically, more ingredients go into our new pale dry beer than in the former, heavier-tasting darker brew. Our new product is more delicate in flavor, and it has a subtle, distinctive hop bouquet. Its dry flavor does not cloy or satiate, giving the beer *sufficiet* (German, meaning it's repetitively "inviting," in other words tends to stimulate continued desire for more).

Our new product follows the trend of the mild-tasting American-type brew which is becoming popular all over the world. A pale dry beer has become the epitome of the American beer drinker's preference.

New Process Initiated

A great many changes had to be made in our process in order to put out this new beer. However, the basic layout of the plant and the major equipment could easily be adapted for processing the new beer. However, the recipe for the ingredients had to be completely changed. But most of the changes were small, and they were made one step at a time.

When "added up" in a processing phase, these minor changes often gave us a completely revamped unit operation—such as our basically changed brew-kettle procedure, and our new hot-wort filtration system.

Brew-Kettle Changes

Our brew-kettle operation was altered in two directions: First, to achieve a lighter colored dryer tasting beer, we had to eliminate sugar caramelization as much as possible and also cut down the hop contact time in the kettle.

Initially, a change was made in the method of introducing wort into the kettle. This solution had been entering the vessel through a 4-in. copper

line about midway between top and bottom. We now extended the tube down to the bottom of the kettle and shaped it so that the flow of entering wort would induce a whirling movement. By eliminating stratification in this manner, over-heating of this more concentrated "first wort" was definitely mitigated. So, too, was the accompanying darkening of the beer and development of a heavier flavor due to the undesirable caramelization of the malt sugar.

Second, hop-contact time in the kettle was trimmed from 50 to 30 min. by improving lines and putting impellers in the pumps. Our procedure now is to boil to the top of the percolating unit, stop, and then allow the wort to gravity-flow from the kettle, leaving about half of the hops in the vessel. Then the remaining hops are rinsed out by a man wielding a 2-in., high-pressure water hose.

As previously intimated, these two changes at the brew-kettle are only part of an alteration. The method of boiling, the steam pressures, and the timing were also altered.

Continuous Hot-Wort Flow

Another example of a fundamental and involved change was the introduction of "wort filtration". It included the installation of new and additional equipment along with a basic variation of the process. With the new filtering station operating between the cooler and fermenting tanks, a 320-bbl. brew is now continuously processed in 3 hr. without need of a buffer tank of sufficient capacity.

Instead of depending on a tendency of the "hot-break" to settle out in the hot-wort tank, this precipitation of undesirable protein matter is eliminated by filtration. The new procedure more effectively separates this so-called hot-break and also removes the protein matter that separates out after cooking (the "cold-break"). The latter precipitate is only about one-seventh the amount of the hot-break. Formerly it had to be removed by settling and decanting into another vat.

Not only does the new procedure eliminate undesirable vat-to-vat pumping to remove unwanted insolubles, but it also greatly enhances the desired results. A whiter, purer yeast, free from trub, is one of the more apparent benefits. And, again, the new method undeniably contributes to delicacy of flavor in the finished product.

Technical Control

In addition to the two examples of process changes briefly outlined above, many other ramifications entered into each step in the many stages of the brewing, fermenting and aging process. In general, most of these changes were pointed toward a twofold improvement in process efficiency and sanitation. A consistent quality in the beer is closely linked to the establishment and maintenance of such technics.

As mentioned, setting up a new process will only provide proper results if the new standards and procedures are closely followed from day to day. In view of this, we will briefly touch on our rather unusual conception of technical control.

We consider technical control in a very broad sense, and do not confine it to the activities of the chemists, bacteriologists and other technicians of the laboratory. Oddly enough, we include machinists, tin-smiths, electricians and even pipe fitters. Our attitude is: Directly or indirectly, any person, place, or thing in the plant may effect the product.

Here's an extreme example of this philosophy: When we systematically check our roofs each month to facilitate maintenance, we also have in mind the possibility that a leaky roof may somehow affect the quality of the product or its package. A more homely example of this reasoning is provided by the rather comprehensive checklist that machinists must run through periodically during bottling or canning operations to make sure that mechanical failure will not mar the quality of product or container.

Simple forms are provided for all of these checks on machinery and equipment as well as the product. A complete record of all operations is kept on file by the responsible person and countersigned by the department head in charge.

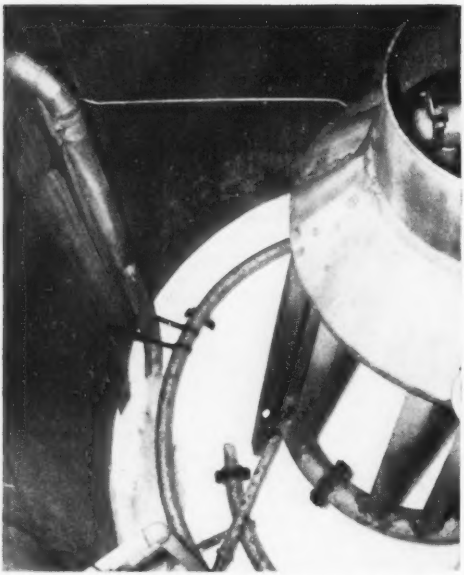
Another thing stressed is laboratory control *throughout* the process, rather than merely concentration on the *final* product. We are interested in that ounce of prevention.

Taste Testing Important

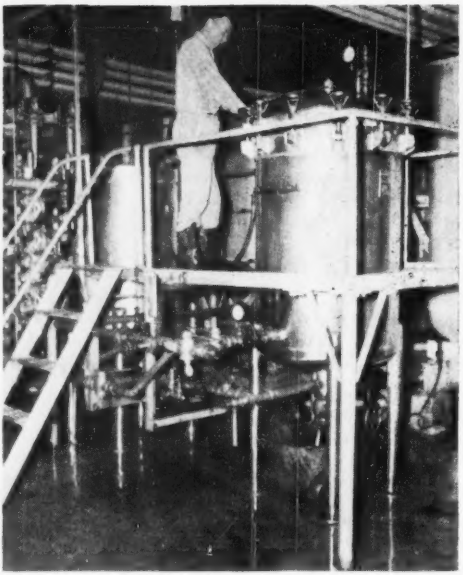
Though one would expect tasting to be an essential part of quality control, it sometimes amazes workers in other food branches to find that sapidity or expert application of taste and smell are utilized all through the brewing process. Much valuable information over and above what laboratory analyses provide can be obtained by experts trained in this field. It is, therefore, a prime requisite of a brewmaster to judiciously use the information derived through the olfactory nerves and epithelial and organs (taste buds) of the tongue.

From the raw grains all through the many stages of the brewing and fermenting processes, samples are tasted as well as chemically analyzed, with

LONG-HAUL FLEET displays new "Pale Dry" slogan. Trailer trucks (26) covered nearly 2,000,000 mi. in Texas in '50.



FEEDLINE (left) was lowered into bottom of brew kettle to swirl wort. Eliminates stratification and overheating.



WITH new wort-filtration station operating between cooler and fermenters, brew is now continuously processed.

definite objectives in mind. And what we learn is utilized in subsequent operations and dictates the necessary controls for time, temperature, blending, and maturing.

Special care is exercised at all times to prevent psychological aspects from influencing taste. The people selected are first tested (using the triangular or three-sample method) for their acuteness and consistency. Care is taken to have the containers, the amount of beer in the containers, the order for sampling, carbonation, amount of foam, and the many conditions in the surrounding atmosphere, all uniform and controlled.

Though we have not gone so far as to have our tasters wear the same color vests, it might not be too facetious to predict this as a future possibility. For, as fastidious as we now are, we are still a long way from that rock where Alexander the Great sat and cried because he had no new worlds to conquer.

THE PLANT

During the year of research, formulation and testing that went into the development of the new brew, an extensive half-million dollar modernization and expansion program was planned to suit the plant to the new process and to provide facilities for a major increase in the capacity of the bottling department.

As mentioned, the unusual layout of the brewery proved very adaptable to changes. With the exception of the completely separate multi-story brewhouse, all the rest of the plant is on one level. The hop-storage and fermenting rooms, ruh cellar, carbonating cellar, finishing cellar and filter department are on this one-story floor level and are cooled to 32 deg. F. Besides containing 200 tanks of various capacities (some close to 40,000 gal. each) these cellars also have coolers, filters, and pumps. Few beer hoses are used, since the tanks are interconnected with three-way 2-in. brass cocks and copper lines.

Equipment Alterations

It was a fairly simple matter then, to adapt existing equipment to new procedures required by the changeover and to locate additional equipment in the literally acres of floor space that the plant afforded.

In the brewhouse a new stainless steel mash cooker was installed. This is located on the second floor of the structure along with a stainless mash tub and 320-bbl. copper brew-kettle. A mezzanine overlooking this floor contains a large plate-and-frame filter press used to remove insolubles from the wort after mashing.

Bottoms of the vessels and their appurtenances can be seen from the floor below. The hop jack and wort cooler are also on this lower floor. The third floor contains the hot-wort tank, hot-water tank, malt mill, and hopper scales. On the smaller fourth and fifth-story are housed the grain-handling equipment. All the walls of the brewhouse are of glazed tile and have generous windows. Floors are terrazza.

From the hot-wort tank in the brewhouse, product is piped over to the fermenting cellar for passage through primary cooler and secondary cooler—the latter a double pipe ammonia heat exchanger. From this point on, the product travels a one-level path until reaching the bottling operation at the other end of the brewery.

New Filter Station

From the cooler, the wort passes to the next major addition to the plant—a custom-made stainless steel Niagara filtering station. This latter unit, a complete innovation in our new process, utilizes diatomaceous earth as a filter aid (100 lb. for 320 bbl. of wort). After filtration, yeast—cultured in a separate air-conditioned all-tile room—is added and the product is pumped into horizontal open-top fermenting tanks.

At the end of 7 days of fermentation, the beer is decanted from the settled yeast—excess of which is drum-dried for livestock feed—and is pumped through a cooler to ruh tanks for secondary fermentation. After several weeks in ruh, the beer is pumped again through a cooler and given its primary filtration. Aging

and carbonation in 1,250-bbl. horizontal tanks follow, the gassing being done entirely by carbonating stones set in fixtures located in the tank bottoms.

Next the beer is again blended to insure uniformity, cooled, and then given its final or polishing filtration by means of a horizontal pulp filter. Then the brilliant pale amber beer is allowed to acclimate itself for a few days in tanks, prior to being run to bottling or canning lines.

To meet the needs of more exacting packaging and greater production, certain lines in the bottle house were replaced. Two brand new 12-oz. lines —employing Meyer 24-wide washers, Cemco 50-spout fillers, Vortex pasteurizers, Tandem labelers and Standard Knapp packers—now each turn out 264 bottles per minute. And through action of a new 50-spout filler and pasteurizer (Meyer) and a high-speed sealer (American Can), the canning line has had its capacity stepped up to 300 per min.

Since the rationing of tinplate, the quart line is seeing more activity. With this line in use, there are now four complete packaging lines turning out a going rate of about 200,000,000 bottles of Gulf's "Grand Prize" beer a year.

Orderliness the Keynote

On the score of "housekeeping," everything non-essential to the operation has been removed and definite locations for the few essentials are provided.

By introducing what seemed to be an exaggerated orderliness, the men gradually forgot about the word "find" and could keep their mind concentrated on their instruments and other tasks.

Our stress on keeping order is especially significant in that the brewing operation goes around the clock and shifts are changing at all stages of the brewing cycle. We primarily attribute the extreme rarity of "bulls" or mistakes to this orderliness program.

THE PROMOTION

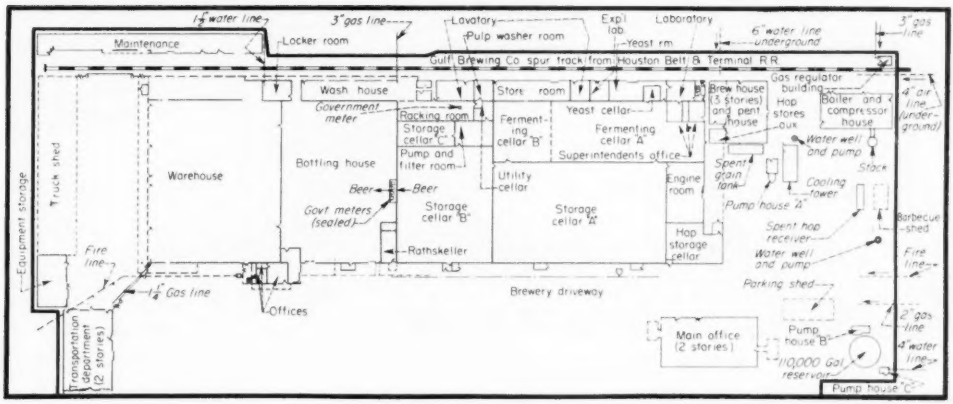
When the new beer was being perfected and the plant being modified to produce it, an intensive sales and advertising campaign was planned to properly set the stage for introduction of the new product.

To retain the familiarity of long established users of our old brand, its name, "Grand Prize," was used for the new brew. However, to denote the basic change in beer type a descriptive epithet—"Pale Dry"—was emphasized in all advertising media. In addition, the label was redesigned and its shape changed—a factor aimed to attract the eye of those beer drinkers who were not patrons of, and therefore instinctively passed by, the old Grand Prize label.

Effective Campaigning

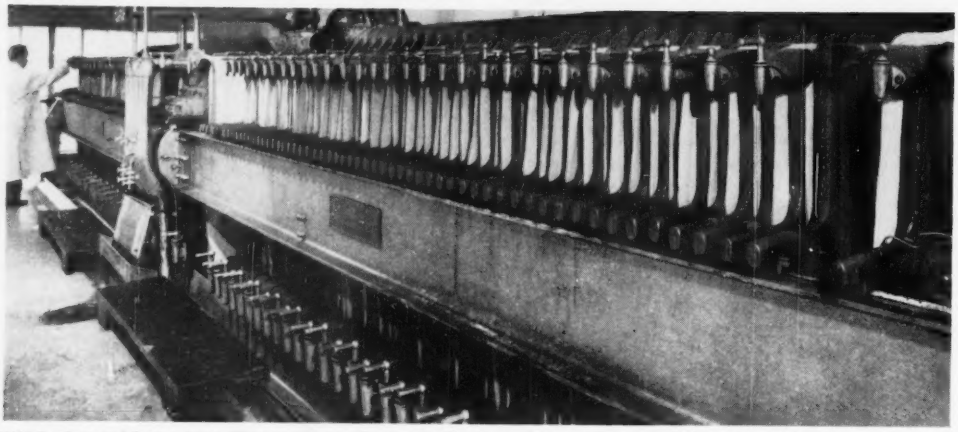
Since the new Grand Prize brew was the first of this type to be produced locally, it faced the major obstacle of similar national brands that had

Layout Features Straightline Production From Brewhouse to Warehouse



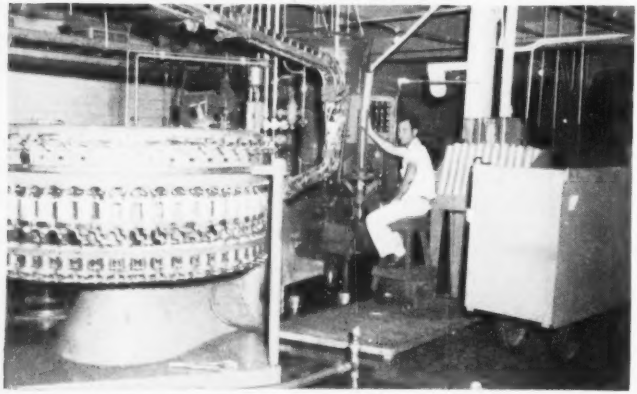
UNIQUE one-story construction provides 160x560 ft. of working space. Multi-story brewhouse is next to stack.

Units That Stepped Up Productivity



HUGE plate-and-frame type filter press speeds up clarification of wort after completion of mashing operation.

BOTTLING: 24-station washer and 50-spout high-speed filler are part of line turning out 248 bottles of beer per minute.

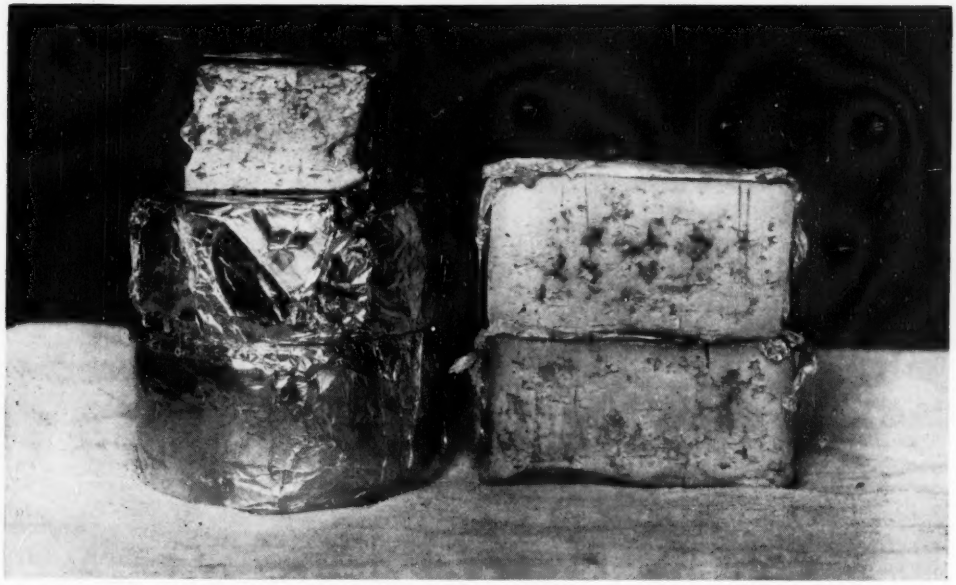


CANNING: 50-spout filler (left) and sealer (operated by worker) handle 300 cans of beer per minute. Automatic case packer is in background.

already penetrated the Texas market in volume. Thus, a "Taste and Compare" theme was developed in initial and subsequent advertising campaigns to challenge the public. This approach proved quite effective, for the new brew compares in flavor and other quality characteristics with higher priced national brands.

When the new beer finally started to roll across Texas in the company's fleet of 26 long haul motor trucks, the careful and intelligent planning that went into its introduction paid off immediate dividends within a very short time.

Within a year, its sales shot up over 40 percent—a most gratifying result during a time when over-all beer sales throughout the country suffered an average decline that amounted to approximately 2 percent.



MOLD-RIPENED CHEESES, such as these, may be extracted to produce essences for flavoring many food products.

New Roquefort-Type Flavors

They Impart Taste Qualities of Mold-Ripened Cheeses

Laboratory extracts convey true flavor to salad dressings, spreads, and other foods . . . Promise also shown by fatty acid-ketone mixtures

STUART PATTON

Assistant Professor of Dairy Manufacture, The Pennsylvania State College, State College, Pa.

A number of specific problems arise with reference to the use of mold-ripened cheeses in commercially prepared salad dressings.

The cheese particles become soggy and disintegrate into an unsightly sludge that settles to the bottom of the container. Moreover, addition of cheese complicates the matter of keeping quality, both from the microbiological and the chemical standpoint.

Sterilization would prevent the microbiological action, but such processing could be expected to have deleterious effects on both the flavor and physical properties of the salad dressing.

Use of somewhat higher acidity might be helpful, but such factors as palatability and the ease with which yeasts and molds tolerate acidity must be considered. Where cheese of the Roquefort type is employed in the manufacture of hot-packed spreads, the resulting product has a dirty, grayish appearance which is unattractive.

From the foregoing it becomes clear that the use of mold ripened cheeses as a source of cheese flavor in processed foods has its limitations. In overcoming these restrictions, two possibilities have been investigated—employment of extracts of natural cheese flavoring, and synthetic Roquefort-type flavors.

Chemical Nature of the Flavor

There can be little doubt that free fatty acids contribute to the flavor of cheeses ripened with penicillium mold. However, it seems unlikely that these acids are the compounds which render this cheese flavor distinctive from that of others, since some rancidity is evident in all cheese.

The aroma of blue cheese strongly suggests the presence of methyl ketones. Hammer and Bryant* believe that methyl n-amyl ketone, in particular, is responsible for part of the characteristic flavor of this type of cheese.

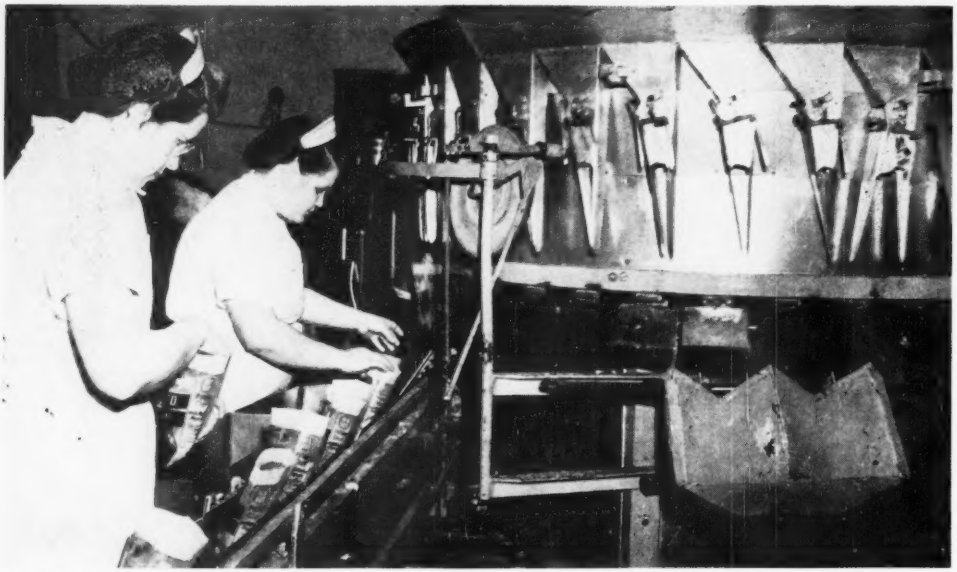
Patton** has recently demonstrated the presence of four methyl ketones in blue cheese. These appear to result from B-oxidation of the four lower fatty acids by the mold. In this latter investigation, the close similarity between the odor of these ketones, particularly methyl n-amyl ketone, and the odor of blue cheese was also observed.

Since both methyl ketones and fatty acids are quite fat-soluble, it may be

(*Turn to page* 157)

* Hammer, B. W. and Bryant, H. W., "A Flavor Constituent of Blue Cheese (Roquefort Type)," *J. Dairy Science*, 11, 281-85, 1937.

** Patton, S. "The Methyl Ketones of Blue Cheese and Their Relation to its Flavor." *J. Dairy Science*, 33, 650-84, 1950.



RED DOT source-to-sale control of quality was possible through plant mechanization. Seen is 32-spout volumetric filler, redesigned to jump filling speed from 40 to 120 bags per minute. Conveyor (left) carries bags upright.

They Engineered

Farm-to-Family Quality

And Raised Output, Cut Labor, and Lowered Costs to Boot

Potato chips strikingly improved when Wisconsin company applies full-range control . . . Farm steps assure source-supply quality. Mechanization advances conditioning, processing, packaging. Astute trucking economizes transport

IVAN C. MILLER
Assistant Editor, "Food Engineering"

To insure year-round high-quality potato chips, Red Dot Foods, Inc., Madison, Wis., adopted a most realistic engineered start-to-finish control program. And not only has it brought the desired product standard, but in addition—

. . . potato conditioning time at the plants has been reduced, permitting an increased volume of chips to be processed out of the plant's warehouse, with no increase in size of the latter.

. . . transportation costs have been lowered, and

. . . materials formerly discarded as plant waste are now profitably utilized.

Particularly credited for these gains is the company's new attention to planting, harvesting and farm warehousing of tubers; advances in plant mechanization; and the new double-duty use of its all-truck transportation system.

In short, Red Dot's program is marked by these major phases: (1) Raw material control, (2) processing control, and (3) distribution control. We will take up these phases in turn:

Closeup of Red Dot's Chip Line

—will be found in this month's graphic FE Picture-Flowsheet. Titled, "Making Quality Potato Chips," it appears in our special foldout on pages 134-137.

1—RAW MATERIAL CONTROL

Production of its own raw supplies —and attendant close control — was established by the company on recogni-

tion of the foremost role that source factors play in achieving final quality of product.

In growing, harvesting, and storing of tubers on its own land, for better yield and quality, Red Dot follows in the footsteps of other practical food processors—such as the refiners who grow their own cane, the canners and freezers who own and manage their own farms, the poultry packers who operate hatcheries and chicken-feeding houses, and also the fish people who process their catches right on the trawlers.

The company avails itself of the full growing season at its 5,000-acre farm in the potato-raising section of Wisconsin, thus extending both the planting and harvesting periods. This gain is made possible through a system of pumping crop irrigation water, when needed, from nearby lakes. Employed is light-weight aluminum piping that reduces the labor of relocating irrigation lines.

Another aid in the full-season scheme is the special laboratory which tests and selects spud varieties, conducts soil analyses, and determines fertilizing and spraying schedules. Also, in order to be certain of a dependable supply of superior tubers at the time of the year when northern potato quality starts to decline, the company leases and farms additional land in Alabama.

Part of the purchased Wisconsin acreage was in timber which when cut, provided lumber for storage buildings erected at the farm.

Warehouse Is Functional

The farm storage of tubers represents a notable advance. Here, there are bins to which air can be supplied as needed for potato conditioning. Circulated by a 25-hp. blower, air is carried below each bin via feeder tunnels (see sketch) branching from a trunk line running the length of the warehouse.

Boards 2-in. thick are placed over the 2 x 2 ft. passageways to form the tunnels. These coverboards are easily removed for access to the tunnels—the purpose will be described in a moment. Supported at floor level on ledges, the lids offer no interference to warehouse traffic. At the high-traffic areas the covers are laid as tightly as possible to confine the blower air. But underneath the bins, 2 x 8 in. planks are spaced to permit air passage to the tubers. A similar tunnel system circulates air in the conditioning warehouses at the plants.

Only when storage temperature drops below 50 deg. F. is conditioning required. Time necessary to restore chipping quality of potatoes may vary from 10 days to 3 weeks. During this time, plant warehouses, warmed by thermostatically controlled unit heaters, are held between 75-80 deg F.

Throughout the winter months, when most conditioning is required, no humidity control is needed. Moisture is always high due to potato "breathing". As air is absorbed by "tuber-breathing", sugar is converted to CO_2 and H_2O, the latter saturating warehouse air.

When potatoes are to be trucked from farm warehouse to one of the plants, coverboards are removed from trunk line and feeder tunnels leading to one of the bins. Then into the tunnels goes a portable conveyor system in 20 ft. lengths—to transport potatoes to sacking and loading platforms. Conveyor-system travel is later reversed to fill the bins.

Return Load Cuts Handling Costs

Ten company-owned tractor-trailers transport potatoes in bags from farm storage to the company plants located at Madison, Wis., Minneapolis, Minn., and Indianapolis, Ind. They also deliver cases of finished products to the company's 43 branch warehouses, from which products are then distributed in small company-owned delivery trucks. Fleets of up to 13 such trucks are operated from each branch.

Trailers at no time travel empty, nor do they depend on outside hauls. Return loads, enroute from branch to plant, contain production supplies, including salt, popping corn, nuts, cheese coating, bags, cans, and cartons.

Plant-to-farm trips are also with payload. All edible waste, such as spilled potato chips, corn (popped and unpopped), nuts, corn chips, potato peel, trimmings, and floor sweeping are collected at the plants and trucked to the farm for cattle and hog feed. Potatoes culled at the farm are also fed to stock.

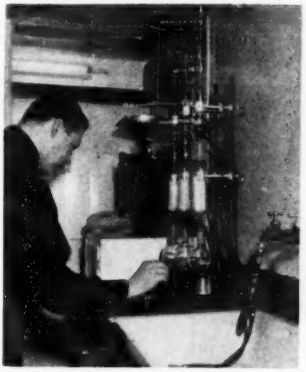
2—PROCESSING CONTROL

We will now consider at length the various engineering steps which Red Dot took to obtain quality control over plant processing operations.

Operating in two shifts at the Madison plant, 165 employees process, package, and distribute approximately 22,000 lb. of chips per day. Abrasive peeling, washing, and slicing of the spuds follow standard procedure. After surface starch and potato slivers are washed away, the slices are drained and treated with sodium bisulphide to remove sugars or amino acids.

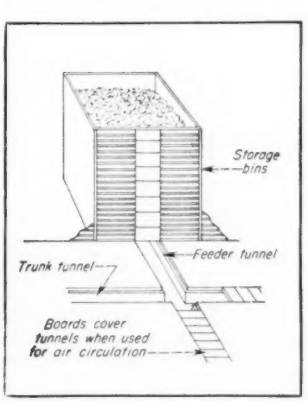
Treated slices then drop into frying fat heated to 375-400 deg. F. Temperature of the fat drops as the chips travel through the continuous fryer. Final temperature as the chips leave the cooker is 275-300 deg. F. Time in the fryer is approximately

Raw Material Control



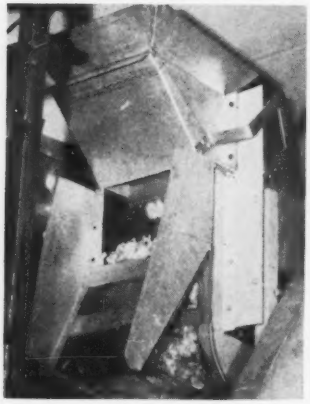
LABORATORY controls quality from raw potatoes to processing and packaging of the finished chips.

BOARD-COVERED tunnels circulate air in plant warehouse to condition spuds for processing.

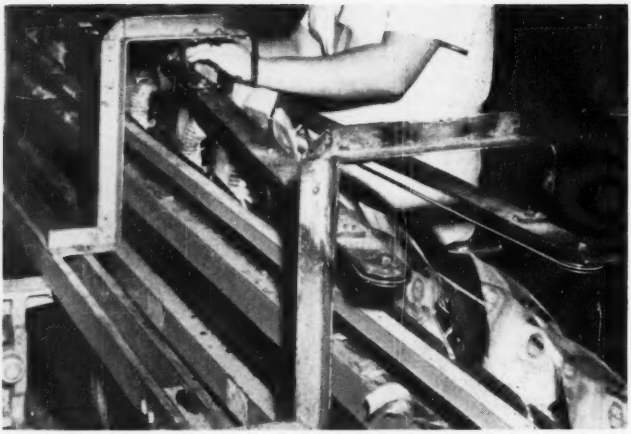


HOW special tunnel system is constructed to aerate farm storage bins. When these are to be filled, tunnel covers are removed and portable conveyors lowered into the channels.

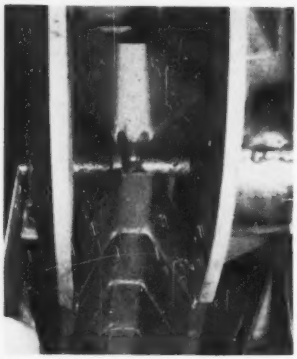
Processing Control



CHIPS in excess of fixed head overflow into chute to bulk filler.



SPRING COIL device, synchronized with conveyor below, aligns bags, closes their tops and uniformly feeds them to heat-sealer.



V-SHAPED CONVEYOR serves as mobile trough, holds bags upright.

3½ min. Total processing time, from raw potato to packaged chips, is 30 min.

Fat temperature control, though not mechanical, is in a sense automatic. Since heat applied to the fryer is a constant, the temperature of the fat fluctuates with the volume of chips processed, so that control of chip volume automatically governs the temperature of frying fat.

Mechanized Packaging Triples Output

When farm warehousing was adapted, conditioning time in plants was reduced, thereby multiplying the volume the warehouses could handle. At the Madison plant the three-line, 1,400-lb.-per-hour processing capacity was sufficient to keep up with the warehouse's bigger supply of raws, increased due to the shorter conditioning time. However, speed-up was bottlenecked by slow packaging.

Originally, the packaging lines had a rate of 40 waxed glassine bags of chips per minute. Bags were then hand-filled by weight and hand-closed with staples.

Many changes and innovations were required to bring costs into line and to improve and maintain quality in the packaged product. Hand-stapling was an initial target in the move to up quality. It was replaced by heat-sealing in order to retard product staling and rancidity.

First improvement was the installation of a 32-spout volumetric filling-machine designed to deliver a uniform flow of chips from a wide mechanically-vibrated trough to filling spouts rotating under the trough at fixed speed. At the start machines filling at a 40-bag-per-min. rate, neither functioned efficiently nor accurately.

However, by making mechanical changes, including the addition of variable speed controls, filling speed was tripled to 120 bags per min., with a weight-of-fill accuracy consistent with that of the former hand operation. We will explain how the machine operates and detail its improvements:

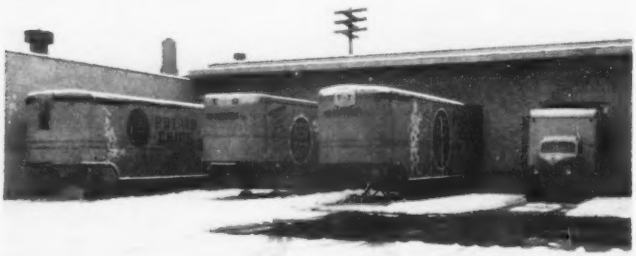
Following inspection in leaving the fryer, chips are delivered from a 64-ft. cooling conveyor to a small hopper —a rectangular enclosure 18 in. wide and about as deep, located above the filler feed. Purpose of the hopper is to maintain a constant head of chips. Excess above the head overflows into a trough, to fill bulk cans.

The hopper bottom is made of plastic and curved to deliver chips to a 3-ft.-long conveyor belt. At this point a 10-in. roller, the width of the hopper, rotates a few inches above the short conveyor and at the same speed as the belt, also in the same direction of travel. A layer of chips of uniform depth is thus deposited on the belt without injury to the fragile product. This feed governs the rate at which chips are delivered to the filling spouts.

The mechanically vibrated trough

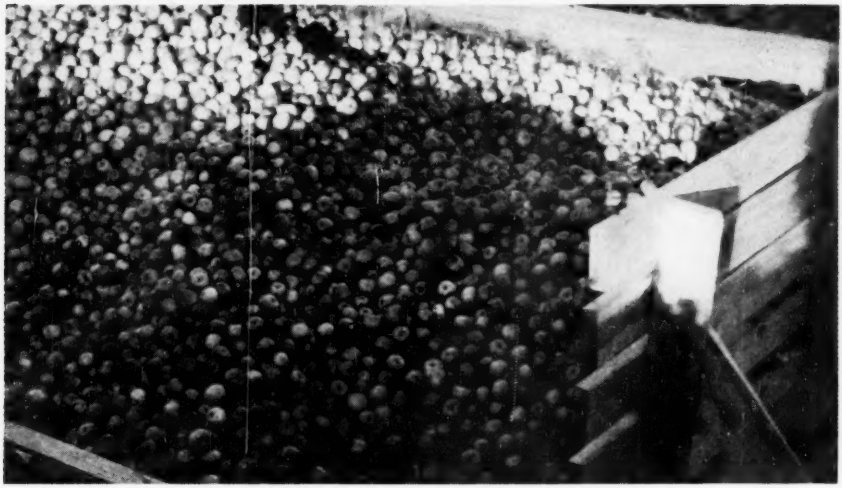
(*Turn to page 176*)

Distribution Control



THESE TRAILERS take chips to branches, bring supplies back, also move potatoes to plants and return waste for feed. Carriers never go empty.

A SPECIAL FOOD ENGINEERING REPORT



Costs and Methods For Pie-Stock Apples

Comparative figures covering various ways of preparing Western fruit for use by Eastern processors are developed and collated by WRRL. Included are data on plant investment, labor, shipping

VERN F. KAUFMAN
Western Regional Research Laboratory, Bureau of Agricultural & Industrial Chemistry, Agricultural Research Administration, USDA, Albany, Calif.

The cost of supplying pie-stock apples to a distant market is influenced mainly by two considerations —weight and volume of the packaged product, and the storage and transportation conditions required.

Minimum costs can be attained only when weight and volume are both small relative to the amount of useful material and when the product can be stored and transported at common storage temperatures. Differences in cost of conventional processing operations are not as important (in their effect on the final price) as the differences in costs involved in methods of subsequent packaging and distribution.

These conclusions are derived from cost estimates made at the Western Regional Research Laboratory during 1948 and 1949. Purpose of these estimates was to provide an economic foundation on which to base laboratory work on improved processes.

Results of the study are presented here because of their widespread interest to industry.

The Pacific Coast states of Washington, Oregon and California have produced a quantity of apples far greater than can be consumed locally. Hence, the apple industry of this re-

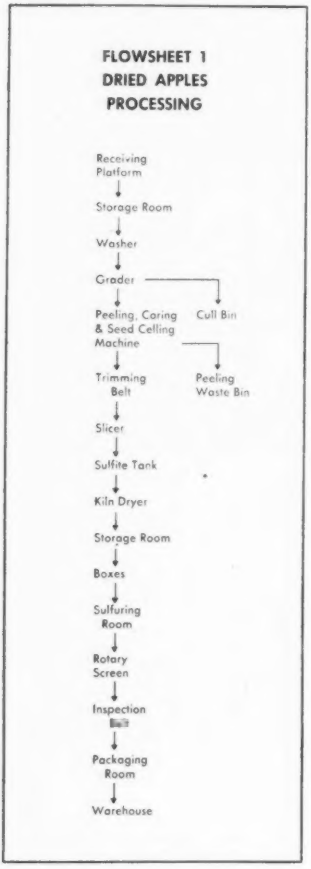
TABLE A—YIELDS AND PACKAGING Data for the Various Apple Products

Product	Yield Per Ton of Fresh Apples	Package Description	Empty Weight, lb.	Processed Weight, lb., From 100 lb. of Fresh Apples	
				Unpackaged	Packaged
Dried	233 lb.	Fiberboard carton, 50 lb.	6	11.66	13.06
Vacuum dried	181 lb.	Fiberboard carton, 30 lb., laminated plastic liner	6	9.06	10.86
Dehydrocanned	16 cases	Case, 6 #10 cans	5	31.5	35.9
Canned	32 cases	Case, 6 #10 cans	5	63.0	71.7
Dehydrofrozen	667 lb.	Can, 20 lb.	1.75	33.3	36.2
Frozen:					
No sugar	1,333 lb.	Can, 20 lb.	1.75	66.7	72.5
Syrup filled:					
Sugar 1:20	1,400 lb.	Can, 21 lb.	1.75	70.0	75.7
Sugar 1:5	1,600 lb.	Can, 24 lb.	1.75	80.0	85.7
Apple slices	1,333 lb.	Box, 50 lb., waxed paper lining.	6	66.7	74.5

gion has been faced with the necessity of marketing this surplus in Eastern or foreign markets. But economic conditions have practically closed foreign markets, other than where subsidies are granted by the Federal government. And Western processed apples have lost many of their Eastern outlets because of high transport costs.

It is recognized that there are large differences in selling prices of the various processed forms of apples, such as dried, canned, or frozen. The price that the consumer pays for the apples and the returns to the farmer are directly affected by intervening costs.

This present study indicates the relative costs of supplying Eastern markets with Western apples processed by various methods. In addition, comparisons have been made with fresh slices processed from apples grown in the consumer's area and with fresh apples from the Pacific Coast states. To limit the scope of this study, estimates have been made only for supplying one of the large users—namely, pie bakers.



Products Listed

In supplying a retail market it is believed that many, but not all, of the costs would be proportional to those for the larger users. Specifically, estimates have been made for supplying, from West Coast to Chicago bakers, the following apple products:

1. Dried.
2. Vacuum dried.
3. Dehydrocanned.
4. Canned.
5. Dehydrofrozen.
6. Frozen, no sugar.
7. Frozen, syrup filled, sugar 1:20.
8. Frozen, sugar 1:5.
9. Frozen, syrup filled, sugar 1:5.

Included in the above list are several products still in the experimental state of development—dehydrocanned; dehydrofrozen; and frozen, syrup-filled. In order to make cost estimates for these, it has been necessary to make assumptions of a commercial processes where production data are not available. Hence, there is a limitation on the certainty of the estimates. But it is probable that the relative positions of of the various products will not be affected appreciably by possible inaccuracies in the assumptions.

Estimates have also been made for two methods of supplying apples when the processing is at, or near, the consumer end:

1. Fresh apple slices are processed from apples grown in areas adjacent to Chicago and distributed directly to the bakeries by the processor.

2. Fresh apples are shipped from the Pacific Coast and processed by bakeries whose operations are sufficiently large to use a mechanized preparation line.

Efforts have been directed toward keeping the costs for the various types of apple products on a true comparative level, rather than toward calculating exact costs. All assumptions have been made with this thought in mind. The cost estimates have been carried up to the time the product is delivered to the user—*i.e.,* the pie baker.

No estimates have been made for the varying costs that might be incurred by the baker when using the different processed apple products. Neither has there been any consideration of "yield" or number of pies that can be made from given quantities of each of the different products.

It is known that rehydration of dried apples does not yield a product with a volume equal to that of the original peeled apples, that leaching of solids occurs during blanching prior to canning, and that some frozen apples are subject to bleeding and mushing when thawed and baked.

These factors must affect the number of pies that can be made from a given

TABLE 1—DRIED APPLES, Summary Cost Sheet

	Totals	Receiving, Preparation and Inspection	Sulfuring	Drying	Packaging	General
Plant Investment	$156,280	$80,180	$7,000	$38,320	$17,780	$13,000
Equipment, installed	($64,280)	($30,180)	($3,000)	($26,320)	($1,780)	($3,000)
Building and land	(92,000)	(50,000)	(4,000)	(12,000)	(16,000)	(10,000)
Processing Costs Per Hr.	$89.65	$52.72	$3.59	$16.34	$10.20	$6.80
Labor	($55.72)	($42.49)	($2.30)	($3.45)	($2.30)	($5.18)
Utilities	(.48)	(.21)	(.02)	(.23)	(.02)	.....
Supplies	(13.93)	.....	(.39)	(7.88)	(5.66)	.....
Charges based on investment	(19.52)	(10.02)	(.88)	(4.78)	(2.22)	(1.62)
Processing Costs						
Per 100 lb. of fresh apples (6,000 lb./hr.)	$1.49	$0.88	$0.06	$0.27	$0.17	$0.11
Per lb. of dried apples (700 lb. hr.)	.128	.075	.005	.023	.015	.010

quantity of apples processed by the various methods. However, no quantitative data on these factors are available that will permit any cost comparisons. One other factor for which estimates cannot be made at this time —but for which estimates must be made before a complete economic evaluation is possible—concerns the variations in selling price because of differences in quality of pies made from the different apple products.

Specifically, the estimates cover the following items:

1. Processor's selling price
   a. Raw materials.
   b. Processing.
   c. Packaging.
   d. Selling and brokerage costs and profit to processor.
2. Storage for six months.
3. Transportation from West Coast to Chicago.
4. Distributor's mark-up, which includes delivery to bakery.

In making the estimates for this study, certain arbitrary bases and assumptions were necessary. It is realized that large variations occur between the operating costs of different commercial plants producing identical products and between the costs for the same marketing operation performed by different people.

Final Costs Are Comparable

For the purpose of simplification, there has been no attempt, in making these estimates, to cover the possible range of costs that might be involved for a given apple product. Rather, the aim has been reasonable assumptions for that product so that costs fall within the range covered by usual commercial operations. These assumptions were then paralleled by assumptions made for other apple products, so that the final costs for each product are therefore on comparable bases.

Employed were the following bases, or assumptions, pertaining to the various products and the plants in which they are produced:

1. *Raw material.* All plants process same grade of apples having a peeling, trimming, and inspection loss of 33.3 percent. Cost of apples delivered to processing plants is $30 per ton. In addition for fresh apple slices prepared in Chicago, allowances are made for cost of storing apples throughout year and for spoilage while in storage. These allowances are added to cost of raw materials (see Tables 8 and 9).

2. *Processing plants.* Average operating rate for all plants is 3 tons of apples per hour; operating hours per yr. are 1,600; and all investment costs are charged to apple processing operations. These investment costs are estimated at 20 percent per year on initial investment, and they include depreciation, interest, taxes, insurance, repair, and maintenance.

3. *Receiving, preparation, inspection, and general costs* are same in all types of plants. This assumption is necessary to keep cost estimates for various apple products on truly comparable levels, though it is not in agreement with average operating conditions as found in industry.

4. *Yield figures* for amounts of finished products per unit of unpeeled apples (see Table A). For canned and dried apples, different figures were obtained from the various sources of information, and it was necessary to use weighted average. For frozen products and fresh slices, yields do not vary greatly from quantity of sliced apples coming from preparation and inspection line (with allowance for sugar added to frozen apples).

5. *Packaging.* Types of packages assumed for each product (Table A) are believed to be the most commonly used types for commercial products. For products that are still in developmental stage, decisions as to types of packages were based on available data

FLOWSHEET 2
VACUUM DRIED APPLES PROCESSING

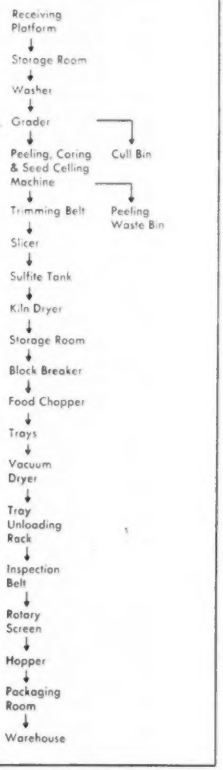


TABLE 2—VACUUM DRIED APPLES, Summary Cost Sheet

	Totals	Receiving, Preparation and Inspection	Sulfuring	Drying, Kiln	Drying, Vacuum	Packaging	Genera
Plant Investment	$233,780	$80,180	$7,000	$38,320	$76,160	$19,120	$13,000
Equipment, installed	($125,780)	($30,180)	($3,000)	($26,320)	($60,160)	($3,120)	($3,000)
Building and land	(108,000)	(50,000)	(4,000)	(12,000)	(16,000)	(16,000)	(10,000)
Processing Costs Per Hr.	$113.09	$52.72	$3.59	$16.34	$20.23	$13.41	$6.80
Labor	($65.15)	($42.49)	($2.30)	($3.45)	($9.43)	($2.30)	($5.18)
Utilities	(.78)	(.21)	(.02)	(.23)	(.29)	(.03)	.....
Supplies	(17.94)	.....	(.39)	(7.88)	(.98)	(8.69)	.....
Charges on investment	(29.22)	(10.02)	(.88)	(4.78)	(9.53)	(2.39)	(1.62)
Processing Costs							
Per 100 lb. of fresh apples (6,000 lb./hr.)	$1.88	$0.88	$0.06	$0.27	$0.34	$0.22	$0.11
Per lb. of product (543 lb./hr.)	.208	.097	.007	.030	.037	.025	.012

and current practice in industry for similar products.

6. *Storage period.* All products are stored for a period of six months, except fresh apple slices. Cost of storage for raw material for latter product has been estimated for specific fractions of year.

7. *Transportation.* All products are produced in Pacific Coast States and shipped to Chicago, except fresh apple slices. Latter are produced in Chicago, or vicinity, from locally grown apples that do not carry appreciable transportation charges, except those incurred by distributor and covered by distributor's mark-up. Transportation costs from West Coast are based on freight and refrigeration rates in effect during summer of 1949. For refrigerated products, costs are based on carloads of permissible minimum weights. For dehydrofrozen and dehydrocanned apples, same rates have been used as for frozen and canned.

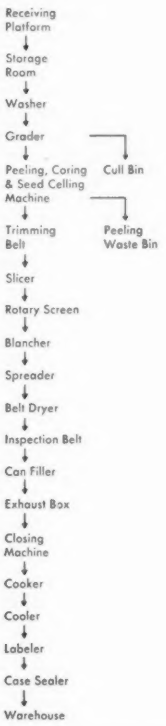
Flowsheets 1 through 7 show the processing plant operations for the various products. The receiving and preparation lines through the hand-trimming operations have been assumed to be identical in the various types of plants. Operations following the preparation line vary for the different products, and special points pertaining to each product are discussed separately.

Flowsheet 1 and Table 1 refer to dried apples. Two types of apple dryers are in commercial use today —tunnel and kiln dryers. The Northwest processors rely mainly on the former; California processors on the latter. Information received from the processors indicates some differences in operating costs between the two types, but for the purposes of this study these are not significant. The cost estimate is based on kiln drying because more data were readily available on this type when the estimate was made.

Vacuum dried apples are covered in Flowsheet 2 and Table 2. This product has been produced by further processing standard dried apples that normally contain 22-24 percent moisture. By drying under vacuum, a product containing 2 percent, or less, moisture may be readily produced. A puffing operation is usually performed in the vacuum dryer prior to the actual drying operation. This is accomplished in the dryer by admitting steam, which is absorbed rapidly by the dry apples.

There follows application of a vacuum to expand the pieces to their original fresh fruit size. If the dried product is cooled under vacuum, then the pieces do not shrink and they will be light in weight. The product will pick up moisture under general atmospheric conditions. Packaging operations are carried out in an air-conditioned room, and moisture-proof containers are required for the product.

FLOWSHEET 3
DEHYDROCANNED APPLES
PROCESSING



Proposed Process

Processing steps and cost data on dehydrocanned apples are given in Flowsheet 3 and Table 3. Dehydrocanning is a proposed process in which a drying operation is interposed prior to the packaging and heat sterilization steps of the canning process. Drying is controlled to obtain a 50 percent weight and volume reduction of the sliced apples, and the product is then handled as in canning.

Purpose of such a process is to gain the advantages offered by the weight and volume being halved and then to follow-up with the advantages of less expensive storage, transportation, and distribution of a canned product as compared with a frozen one. (See remarks about a suitable dryer under discussion on dehydrofrozen apples.)

To date, there has not been sufficient lab work to prove the technical feasibility of the dehydrocanning process.

Canned apples (Flowsheet 4 and

TABLE 3—DEHYDROCANNED APPLES, Summary Cost Sheet

	Totals	Receiving, Preparation and Inspection	Blanching	Drying, Belt	Packaging	Cooking	General
Plant Investment	$261,480	$80,180	$19,520	$111,880	$26,000	$10,900	$13,000
Equipment, installed	($157,180)	($30,180)	($11,520)	($101,880)	($5,000)	($5,600)	($3,000)
Building and land	$104,300)	(50,000)	(8,000)	(10,000)	(21,000)	(5,300)	(10,000)
Processing Costs Per Hr.	$133.33	$52.72	$7.23	$21.46	$41.87	$3.25	$6.80
Labor	($61.99)	($42.49)	($2.19)	($4.08)	($6.90)	($1.15)	($5.18)
Utilities	(.94)	(.21)	(.08)	(.55)	(.04)	(.06)	.....
Supplies	(37.73)	.....	(2.52)	(2.85)	(31.68)	(.68)	.....
Charges on investment	(32.67)	(10.02)	(2.44)	(13.98)	(3.25)	(1.36)	(1.62)
Processing Costs							
Per 100 lb. of fresh apples (6,000 lb. per hr.)	$2.22	$0.88	$0.12	$0.36	$0.70	$0.05	$0.11
Per dozen No. 10 cans (315 cans/hr.) (26.25 doz./hr.)	5.55	2.20	.30	.89	1.74	.14	.28

TABLE 4—CANNED APPLES, Summary Cost Sheet

	Totals	Receiving, Preparation and Inspection	Blanching	Packaging	Cooking	General
Plant Investment	$168,900	$80,180	$19,520	$39,700	$16,500	$13,000
Equipment, installed	($60,900)	($30,180)	($11,520)	($7,700)	($8,500)	($3,000)
Building and land	(108,000)	(50,000)	(8,000)	(32,000)	(8,000)	(10,000)
Processing Costs Per Hr.	$149.77	$52.72	$7.23	$78.71	$4.31	$6.80
Labor	($61.36)	($42.49)	($2.19)	($10.35)	($1.15)	($5.18)
Utilities	(.39)	(.21)	(.08)	(.04)	(.06)	.....
Supplies	(66.92)	.....	(2.52)	(63.36)	(1.04)	.....
Charges on investment	(21.10)	(10.02)	(2.44)	(4.96)	(2.06)	(1.62)
Processing Costs						
Per 100 lb. of fresh apples (6,000 lb./hr.)	$2.49	$0.88	$0.12	$1.31	$0.07	$0.11
Per dozen No. 10 cans (576 cans/hr.) (48 doz. cans/hr.)	3.12	1.10	.15	1.64	.09	.14

Table 4) and the processes for its production are well known in the industry.

While considerable laboratory work has been performed involving the dehydrofrozen method (Flowsheet 5 and Table 5), data are still lacking for the drying operation as to types of commercial dryers that are suitable and their drying capacities. This estimate is based on steam-heated belt dryers, with a belt loading of 1.25 lb. of apple slices per square foot and a drying time of 30 min. to attain a 50 percent weight reduction of the apples as fed to the dryers.

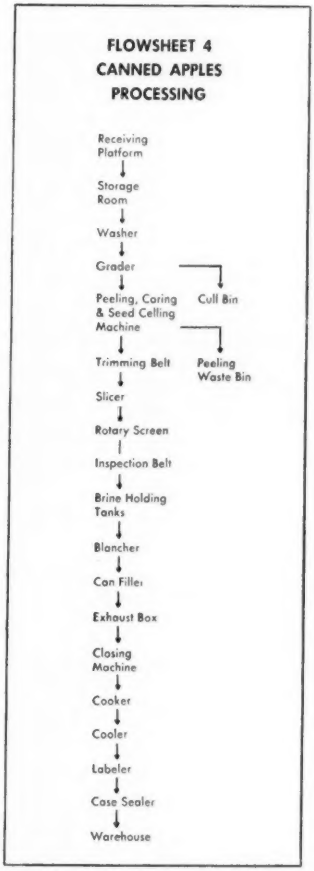
Tin Cans Used in Study

Use of "30-lb." tin cans for packaging has been assumed. The possibility of using fiber board boxes with moisture-resistant liners to lower costs might be considered. However, to keep the costs for this product on a strictly comparable level with those for frozen apples, we have assumed the same degree of protection for both products and based the study on the use of tin cans.

Four types of frozen apples (see Flowsheet 6 and Tables 6a-6d) are included in this study:

1. *Frozen, without sugar.* Freshly prepared slices are dipped in a sulfite solution to prevent discoloration and then frozen.

2. *Frozen, syrup filled, sugar* 1:20. Freshly prepared slices are subjected to a vacuum while immersed in a 40-60 percent syrup solution containing 200-300 ppm. of sulfite. Release of vacuum while slices are immersed causes solution to penetrate slices. During these operations there is an interchange of liquids between slices and syrup, and former gain in sugar content. It is assumed that by proper regulation there is no net change in total water content of slices, and that slices take up sugar equivalent to 5 percent of their weight.



It is assumed that a sugar loss of 100 lb. per 8-hr. shift will be incurred by discarding syrup solution as it becomes contaminated by continual use.

3. *Frozen, sugar* 1:5. To same product as No. 1, one part of dry sugar is added to 5 parts of apples by weight in package prior to freezing.

4. *Frozen, syrup filled, sugar* 1:5. To same product as No. 2, dry sugar is added to bring total sugar up to same quantity as in No. 3.

In packaging these four types, the same apple content—20 lb.—is filled into each can. It has been assumed that the addition of sugar does not change the quantity of apples that is packed into a can.

Sugar costs are figured at 8c. per lb. Here, cost of the sugar absorbed by the apples is included in the cost of raw materials (as shown in Table 8). The cost of the sugar discarded in contaminated solutions is included under supplies.

It is assumed that the processing of the fresh slices (Flowsheet 7 and Table 7) is done in the Chicago area, using apple orchards in Illinois and Michigan as a source of supply. The operations are continued throughout the year, with fluctuations in the working hours so that the number of hours that the plant operates per year (1,600) is the same as for the plants for the other methods of processing. Amount of apples processed is the same for all plants, so the investment cost-rates per unit of plant input are the same.

The cost of apples for this operation has been discussed previously under "Raw Material." It has been assumed that costs for similar supplies, equipment, and labor requirements will be the same in the Chicago area as on the Pacific Coast.

The estimate for fresh apples is covered by Table 9.

Table 8 summarizes costs incurred by the processing plants. An allowance

of 15 percent of the selling price at the processing plant is included for selling and brokerage costs and profits before taxes. This is based on information given in the annual reports of some of the larger canning companies.

Table 9 summarizes the major costs involved in supplying each product to the baking trade in the Chicago area.

Between processing plant and pie baker, the processed apple products are subject to storage, transportation, and distribution costs. Storage costs are based on quoted rates in the San Francisco Bay area. A distributor's mark-up of 10 percent of cost to the distributor is allowed on non-refrigerated products. This was derived from data from the 1939 *Census of Wholesale Trade* (Vol. 2, p. 50). For refrigerated products, a 15 percent mark-up is used.*

For the various frozen apple products, allowances are made for the value of the sugar present so that the cost of the apple component in the product is shown. Value of the sugar is based on the assumption that the baker can buy sugar at the same price as the processor (8c. per lb).

FLOWSHEET 5
DEHYDROFROZEN APPLES
PROCESSING

Fresh Apples Included

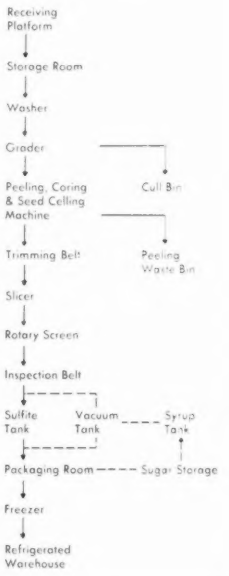
Also included in Table 9 is an estimate for fresh apples based on data from a report of the Bureau of Agricultural Economics (USDA), titled "Marketing Margin for Washington Apples Sold in Chicago, 1947-8", and published in *The Marketing and Transportation Situation* (Aug. 1949). An allowance of $.88 per 100 lb. is made for the baker's costs to get the fresh apples to a sliced form. Including this allowance in the "Cost to the Baker" (Table 9) places this product at approximately the same state of readiness for use by the baker as the other products for which estimates are shown.

The cost comparisons made in the following discussions are all based on the equivalent amounts of the various processed forms produced from the same amounts of fresh, unpeeled apples. Adjustments in costs have been made for the sugar in the frozen products so that the comparisons are based on the apple component of the products only.

Here are the conclusions on plant investments (based on the figures in Table 8, unless otherwise noted):

1. Investment in a plant producing fresh apple slices is lower than for any other type plant because of fewer operations involved. For other commercial processes, drying and canning

FLOWSHEET 6
FROZEN APPLES
PROCESSING



* *Food Freezing* 2 (4): 270, Mar. 1947; and *Western Canner & Packer* 36 (12): 43-44, Nov. 1944.

TABLE 5—DEHYDROFROZEN APPLES Summary Cost Sheet

	Totals	Receiving, Preparation and Inspection	Sulfiting	Drying, Belt	Packaging	Freezing	General
Plant Investment	$285,550	$80,180	$3,440	$111,880	$13,550	$63,550	$13,000
Equipment, installed	($182,050)	($30,180)	($1,440)	($101,880)	($550)	($45,000)	($3,000)
Building and land	(103,500)	(50,000)	(2,000)	(10,000)	(13,000)	(18,500)	(10,000)
Processing Costs Per Hr.	$129.11	$52.72	$1.11	$21.46	$36.06	$10.96	$6.80
Labor	($58.13)	($42.49)	.....	($4.08)	($4.37)	(2.01)	(5.18)
Utilities	(1.78)	(.21)	(0.02)	(.55)	.....	(1.00)	.....
Supplies	(33.51)	.....	(.66)	(2.85)	(30.00)	.....	.....
Charges on investment	(35.69)	(10.02)	(.43)	(13.98)	(1.69)	(7.95)	(1.62)
Processing Costs							
Per 100 lb. of fresh apples (6,000 lb./hr.)	$2.15	$0.88	$0.02	$0.36	$0.60	$0.18	$0.11
Per lb. of product (2,000 lb./hr.)	.064	.026	.001	.011	.018	.005	.003

TABLE 6a—FROZEN APPLES, Without Sugar, Summary Cost Sheet

	Totals	Receiving, Preparation and Inspection	Sulfiting	Packaging	Freezing	General
Plant Investment	$213,480	$80,180	$3,440	$20,860	$96,000	$13,000
Equipment, installed	($103,480)	($30,180)	($1,440)	($860)	($68,000)	($3,000)
Building and land	(110,000)	(50,000)	(2,000)	(20,000)	(28,000)	(10,000)
Processing Costs Per Hr.	$148.58	$52.72	$1.11	$71.12	$16.83	$6.80
Labor	($59.06)	($42.49)	.....	($8.51)	($2.88)	($5.18)
Utilities	(2.18)	(.21)	(0.02)	.....	(1.95)	.....
Supplies	(60.66)	.....	(.66)	(60.00)	.....	.....
Charges on investment	(26.68)	(10.02)	(.43)	(2.61)	(12.00)	(1.62)
Processing Costs						
Per 100 lb. of fresh apples (6,000 lb./hr.)	$2.48	$0.88	$0.02	$1.19	$0.28	$0.11
Per lb. of product (4,000 lb./hr.)	0.037	.013	.000	.018	.004	.002

TABLE 6b—FROZEN APPLES, Syrup Filled, Sugar 1:20, Summary Cost Sheet

	Totals	Receiving, Preparation and Inspection	Syrup Filling (Excluding Sugar Absorbed)	Packaging	Freezing	General
Plant Investment	$219,100	$80,180	$9,060	$20,860	$96,000	$13,000
Equipment, installed	($107,100)	($30,180)	($5,060)	($860)	($68,000)	(3,000)
Building and land	(112,000)	(50,000)	(4,000)	(20,000)	(28,000)	(10,000)
Processing Costs Per Hr.	$151.49	$52.72	$4.02	$71.12	$16.83	$6.80
Labor	($60.21)	($42.49)	($1.15)	($8.51)	($2.88)	($5.18)
Utilities	(2.24)	(.21)	(.08)	.....	(1.95)	.....
Supplies	(61.66)	.....	(1.66)	(60.00)	.....	.....
Charges on investment	(27.38)	(10.02)	(1.13)	(2.61)	(12.00)	(1.62)
Processing Costs						
Per 100 lb. of fresh apples (6,000 lb./hr.)	$2.53	$0.88	$0.07	$1.19	$0.28	$0.11
Per lb. of product (4,200 lb./hr.)	.036	.013	.001	.017	.004	.001

TABLE 6c—FROZEN APPLES, With Sugar 1:5, Summary Cost Sheet

	Totals	Receiving, Preparation and Inspection	Sulfiting	Sugaring (Excluding Sugar)	Packaging	Freezing	General
Plant Investment	$217,800	$80,180	$3,440	$4,320	$20,860	$96,000	$13,000
Equipment, installed	($103,800)	($30,180)	($1,440)	($320)	($860)	($68,000)	($3,000)
Building and land	(114,000)	(50,000)	(2,000)	(4,000)	(20,000)	(28,000)	(10,000)
Processing Costs Per Hr.	$151.17	$52.72	$1.11	$2.59	$71.12	$16.83	$6.80
Labor	($61.13)	($42.49)	.....	($2.07)	($8.51)	($2.88)	($5.18)
Utilities	(2.18)	(.21)	(0.02)	.....	.....	(1.95)	.....
Supplies	(60.66)	.....	(.66)	.....	(60.00)	.....	.....
Charges on investment	(27.20)	(10.02)	(.43)	(.52)	(2.61)	(12.00)	(1.62)
Processing Costs							
Per 100 lb. of fresh apples (6,000 lb./hr.)	$2.52	$0.88	$0.02	$0.04	$1.19	$0.28	$0.11
Per lb. of product (4,800 lb./hr.)	.032	.011	.000	.001	.015	.004	.001

TABLE 6d—FROZEN APPLES, Syrup Filled, Sugar 1:5, Summary Cost Sheet

	Totals	Receiving, Preparation and Inspection	Syrup Filling (Excluding Sugar Absorbed)	Sugaring (Excluding Sugar)	Packaging	Freezing	General
Plant Investment	$223,420	$80,180	$9,060	$4,320	$20,860	$96,000	$13,000
Equipment, installed	($107,420)	($30,180)	($5,060)	($320)	($860)	($68,000)	($3,000)
Building and land	(116,000)	(50,000)	(4,000)	(4,000)	(20,000)	(28,000)	(10,000)
Processing Costs Per Hr.	$154.08	$52.72	$4.02	$2.59	$71.12	$16.83	$6.80
Labor	($62.28)	($42.49)	($1.15)	($2.07)	($8.51)	($2.88)	($5.18)
Utilities	(2.24)	(.21)	(.08)	.....	.....	(1.95)	.....
Supplies	(61.66)	.....	(1.66)	.....	(60.00)	.....	.....
Charges on investment	(27.90)	(10.02)	(1.13)	(.52)	(2.61)	(12.00)	(1.62)
Processing Costs							
Per 100 lb. of fresh apples (6000 lb./hr.)	$2.57	$0.88	$0.07	$0.04	$1.19	$0.28	$0.11
Per lb. of product (4,800 lb./hr.)	.033	.011	.001	.001	.015	.004	.001

plants are appreciably less costly than vacuum drying or freezing plants.

2. Equipment cost for dehydrofreezing is highest of the processes. Belt dryers on which estimate is based represent major part of equipment cost (Table 5).

3. In freezing processes using syrup filling, additional cost of syrup filling equipment is a minor part of total plant cost (about 2.5 percent).

Given below are conclusions on selling price, F.O.B. processor (based on figures shown in Table 8):

1. Receiving, preparation, and inspection costs are a major portion (42 to 87 percent) of processing costs other than packaging for all processes. Labor requirements are usually high for preparation and inspection when a high-quality product is desired.

2. Sliced apples show a low processing cost because of simple processing operations involved.

3. Packaging is main item resulting in large differences in costs at processor's level. Highly concentrated products (dried and vacuum dried) show very low packaging costs; partially concentrated products (dehydrocanned and dehydrofrozen) show intermediate packaging costs; and unconcentrated products (canned and frozen) show high packaging costs. Fresh sliced apples show a low packaging cost because of re-use of containers.

Factors Involved

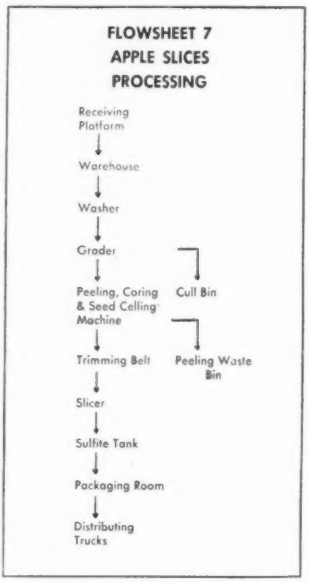
The following conclusions are on cost to the baker (derived from figures in Table 9):

1. Storage costs for finished products vary widely. Storage for apples as frozen slices costs 25-30 times as much as for an equivalent quantity in dried form. Two factors determine these costs: (a) Weight or volume of product; (b) need or lack of need for refrigeration.

2. Variation in transportation costs increases variation in ultimate prices of the different products. The same factors that affect storage costs (weight and volume of product, and need, or lack of need, for refrigeration) also govern transportation costs.

The latter costs are especially significant to the western apple industry. Transportation costs (West Coast to Chicago), calculated on a basis of equivalents of a ton of fresh apples shipped in the various forms, are:

Dried	$ 5.40
Vacuum dried	5.00
Dehydrocanned	10.80
Canned	21.40
Dehydrofrozen	15.00
Frozen	
Without sugar	30.00
Sugar 1:20	31.40
Sugar 1:5	35.40
Fresh apples (in boxes)	33.20



The eastern apple industry need pay only a fraction of these transportation costs, because of the relatively shorter distances to markets. Unless the western processors and growers can get a premium for their products, they must absorb the additional amount of transportation costs inherent to each particular product or not ship that product to eastern markets. Returns to the growers for processing grade apples have in most years been less than the transportation costs on all the commercial products, except dried and vacuum dried.

The western apple industry in general has not been able to absorb the additional transportation costs on canned and frozen fruit, and therefore it has, primarily, processed dried apples. The eastern apple processors apparently have the eastern market for canned and frozen products much to themselves as a result of the advantages of transportation costs.

Production of dried apples in the eastern states has relatively less advantage because of the smaller differences in transportation costs.

3. Distributor's costs, or percentage markups, are another factor of appreciable importance in increasing differences in costs between various products. Again, the same basic factors of refrigeration, weight, and volume that governed storage and transportation costs are biggest reasons for different costs at distributor level.

4. Relationship between relative costs to baker for various processed forms and requirements for a low-cost product are also to be considered (see Table 10).

5. Relative costs to bakery trade in Chicago of the apple component in the four frozen-apple products considered in this report are:

Without sugar	$1.00
Syrup filled, sugar 1:20	1.04
Sugar 1:5	1.12
Syrup filled, sugar 1:5	1.13

TABLE 7—APPLE SLICE, Summary Cost Sheet

	Totals	Receiving, Preparation and Inspection	Sulfiting	Packaging	General
Plant Investment	$109,140	$80,180	$3,440	$12,520	$13,000
Equipment, installed	($35,140)	($30,180)	($1,440)	($520)	($3,000)
Building and land	(74,000)	(50,000)	(2,000)	(12,000)	(10,000)
Processing Costs Per Hr.	$73.14	$52.72	$1.11	$12.51	$6.80
Labor	($51.01)	($42.49)	.....	($3.34)	($5.18)
Utilities	(.23)	(.21)	(0.02)	.....	.....
Supplies	(8.26)	.....	(.66)	(7.60)	.....
Charges on investment	(13.64)	(10.02)	(.43)	(1.57)	(1.62)
Processing Costs					
Per 100 lb. of fresh apples (6,000 lb./hr.)	$1.22	$0.88	$0.02	$0.21	$0.11
Per lb. of product (4,000 lb./hr.)	.018	.013	.000	.003	.002

TABLE 8—SUMMARY COSTS at Apple Processing Plants

	Dried	Vacuum Dried	Dehydro-canned	Canned	Dehydro-frozen	Frozen No Sugar	Frozen, Syrup Filled, Sugar 1:20	Frozen Sugar 1:5	Frozen, Syrup Filled, Sugar 1:5	Apple Slices From Illinois or Michigan Apples			
										Yearly Average	October	March	July
Plant Investment (2 tons/hr. of fresh apples), Total	$156,280	$233,780	$261,480	$168,900	$285,550	$213,480	$219,100	$217,800	$223,420	$109,140	....	....	....
Equipment, installed	64,280	125,780	157,180	60,900	182,050	103,480	107,100	103,800	107,420	35,140	....	....	....
Building and land	92,000	108,000	104,300	108,000	103,500	110,000	112,000	114,000	116,000	74,000	....	....	....
Selling Price— F.O.B. Processor													
Per 100 lb. of fresh apples	$3.52	$3.98	$4.38	$4.70	$4.30	$4.68	$5.06	$5.99	$6.04	$4.09	$3.04	$3.78	$5.58
Processing costs other than packaging	1.32	1.66	1.52	1.18	1.55	1.29	1.34	1.33	1.38	1.01	1.01	1.01	1.01
Receiving, Preparation & Inspection	.88	.88	.88	.88	.88	.88	.88	.88	.88	.88	.88	.88	.88
Sulfuring	.06	.06	....	....	....	....	....	....	....	....	....	....	....
Sulfiting	....	....	....	....	.02	.02	....	.02	....	.02	.02	.02	.02
Blanching	....	....	.12	.12	....	....	....	....	....	....	....	....	....
Drying, kiln	.27	.27	....	....	....	....	....	....	....	....	....	....	....
Drying, belt	....	....	.36	....	.36	....	....	....	....	....	....	....	....
Drying, vacuum	....	.34	....	....	....	....	....	....	....	....	....	....	....
Cooking	....	....	.05	.07	....	....	....	....	....	....	....	....	....
Syrup filling (excl. cost of sugar in product)	....	....	....	....	....	....	.07	....	.07	....	....	....	....
Sugaring (excl. cost of sugar)	....	....	....	....	....	....	....	.04	.04	....	....	....	....
Freezing	....	....	....	....	.18	.28	.28	.28	.28	....	....	....	....
General	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11	.11
Packaging	.17	.22	.70	1.31	.60	1.19	1.19	1.19	1.19	.21	.21	.21	.21
Raw materials	1.50	1.50	1.50	1.50	1.50	1.50	1.77	2.57	2.57	2.44	1.50	2.16	3.77
Apples	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	2.44	1.50	2.16	3.77
Sugar	....	....	....	....	....	....	.27	1.07	1.07	....	....	....	....
Selling costs, brokerage & profit	.53	.60	.66	.71	.65	.70	.76	.90	.90	.43	.32	.40	.59

TABLE 9—BREAKDOWN of Cost to Baker of Apple Pie Stock

	Dried	Vacuum Dried	Dehydro-canned	Canned	Dehydro-frozen	Frozen, No Sugar	Frozen, Syrup Filled, Sugar 1:20	Frozen, Sugar 1:5	Frozen, Syrup Filled, Sugar 1:5	Apple Slices From Illinois or Michigan Apples				Fresh Washington Apples
										Yearly Average	October	March	July	
Costs Per 100 Lb. of Fresh Apples														
Raw materials	$1.50	$1.50	$1.50	$1.50	$1.50	$1.50	$1.77	$2.57	$2.57	$2.44	$1.50	$2.16	$3.77	$1.50
Processing other than packaging	1.32	1.66	1.52	1.18	1.55	1.29	1.34	1.33	1.38	1.01	1.01	1.01	1.01	2.75[3]
Packaging	.17	.22	.70	1.31	.60	1.19	1.19	1.19	1.19	.21	.21	.21	.21	
Selling, brokerage & profit	.53	.59	.66	.71	.65	.70	.76	.90	.90	.43	.32	.40	.59	
Selling Price, F.O.B. Processor	3.52	3.98	4.38	4.70	4.30	4.68	5.06	5.99	6.04	4.09	3.04	3.78	5.58	4.25
Storage, 6 mo.	.04	.09	.11	.23	.54	1.09	1.14	1.29	1.29	....[5]	....[5]	....[5]	....[5]	....
Transportation, West Coast to Chicago	.27	.25	.54	1.07	.75	1.50	1.57	1.77	1.77	....	....	....	....	1.66
Cost to Distributor	3.83	4.32	5.03	6.00	5.59	7.27	7.77	9.05	9.10	....	....	....	....	5.91
Distributor's mark-up	.38	.43	.50	.60	.84	1.09	1.16	1.36	1.36	.50[4]	.50[4]	.50[4]	.50[4]	.89
Cost to Baker	4.21	4.75	5.53	6.60	6.43	8.36	8.93	10.41	10.46	4.59	3.54	4.28	6.08	7.68[2]
Price for sugar in product (subtracted)	....	....	....	....	....	....	.27	1.07	1.07	....	....	....	....	....
Cost of Apple Component in Product to Baker	4.21	4.75	5.53	6.60	6.43	8.36	8.66	9.34	9.39	4.59	3.54	4.28	6.08	7.68
Cost to Baker														
Per lb. of Product	$0.361	$0.520	.....	.....	$0.193	$0.125	$0.127	$0.130	$0.131	$0.069	$0.053	$0.064	$0.091	$0.077
Per No. 10 Can	.....	.....	$1.15	$0.69	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

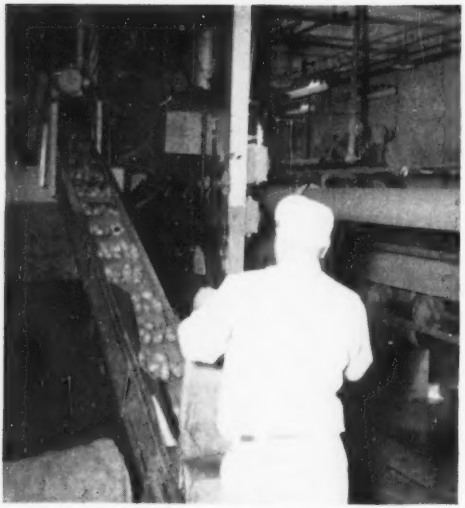
[1] Costs for fresh apples estimated from data taken from B.A.E. report: "Marketing Margins for Washington Apples Sold in Chicago 1947–8," in *The Marketing & Transportation Situation*, Aug. 1949, p. 6.
[2] Includes storage costs
[3] Includes $0.88 for baker's costs for receiving, preparing and inspecting apples at bakery
[4] Distribution costs from processor to baker
[5] Storage costs for fresh apples covered in raw material costs.

Thus, it is indicated that the addition of sugar (1:5) to frozen apples increases the cost to the user 12 percent. This rise does not include cost of the sugar. Rather, it is the additional expense of storing, transporting, and distributing the sugar included with the apples.

Acknowledgment is made to numerous members of the Western Regional Laboratory staff for assistance in gathering data to make the cost estimates. And specially credited are Wallace Miller, Valley Evaporating Co., Chelan Falls, Wash., and W. E. Gallwey, Vacu-Dry Co., Oakland, Calif., for review of these estimates.

TABLE 10—RELATIONSHIP Between Relative Costs to Baker for Various Processed Forms of Apples and Requirements for a Low-Cost Product

Product	Relative Costs (Based on Cost of Dried Apples)	Reasons for Cost Advantage or Disadvantage
Dried	1.00	Low weight and volume, no refrig.
Vacuum dried	1.13	Very low weight, intermediate volume, no refrig.
Dehydrocanned	1.31	Intermediate weight and volume, no refrig.
Canned	1.57	High wt. and vol., no refrig.
Dehydrofrozen	1.53	Intermediate wt. and vol., refrig. required
Frozen, no sugar	1.99	High wt. and vol., refrig. required
Syrup filled, sugar 1:20	2.06	High wt. and vol., refrig. required. Extra cost caused by weight and value of added sugar
Sugar	2.22	
Syrup filled, sugar 1:5	2.23	



1 **POTATOES** are elevated to washer, thence go by conveyor to feed end of continuous steam peeler (rear).

2 **OPERATOR** adjusts single valve, that regulates peeler's temperature. Conveyor plungers are seen underneath.

Quality Peeling Sets a New Pace

Engineered continuous steam peeling line links volume harvests to rapid-fire canning at Gerber's . . . Flexible set-up handles most fruits and vegetables

LLOYD E. SLATER
Assistant Editor, "Food Engineering"

Through the skillful application of advanced engineering on its multi-purpose continuous peeling line, Gerber Products Co., Fremont, Mich., has taken an operation demanding kitchen-table scrupulousness and stepped it up so that it meshes with harvest surges and volume canning technics.

With quality the keynote, the company's baby-food processing demands a fast traveling relay of products from field to container. And just as a track relay team wins or loses on the capability of its weakest runner, so too with this food plant operation, where flagging along the route could mean the defeat of quality.

Gerber's relay had to show better performance in the vital primary run in which the raw materials were prepared. And this needed boost was achieved by installing a Cleaver-Brooks continuous steam peeler* as the heart of the preparation line.

Since the 1950 packing season, when this equipment went in, output has been unusually high. Integrated with washing and conveying units, the new line has proved its superiority over previous methods. It has—

- **Doubled capacity—output of some Crops having zoomed to 8 tons per hour.**
- **Bettered product—due to less skin retention and minimizing of damage in handling.**
- **Eliminated waste—for sizable losses due to "deep" peeling are avoided.**
- **Reduced supervision—since now only four men are needed to service the processing line and trim tables.**

The peeling line is very versatile. Apples, pears, beets, carrots, squash, white and sweet potatoes can be processed on it with the same high speed efficiency.

Let's follow one of these products—white potatoes—through the line for a closeup of the mechanics of the operation, first scrutinizing the peeler itself.

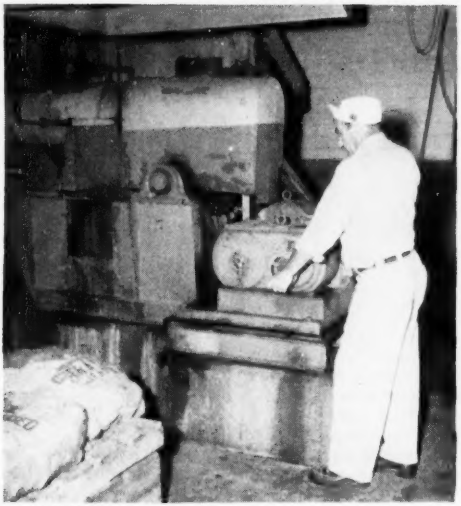
Closeup of Peeler

Construction of the continuous peeler is remarkably simple. Its steam pressure tube consists of fine flange-joined 6-ft. sections of 12-in. dia. heavy gage stainless steel pipe. Three of these sections are fed by six steam inlets. The feed-in end of the tube, however, is open to the atmosphere. To remove steam escaping, both ends of the tube are hooded. Steam in the discharge section is condensed by water sprays to form a vacuum.

Product mover in the peeler is an endless loop of 54 gasketed stainless steel pistons connected by jointed rod linkages. This loop travels through and below the pressure tube by means of motor driven sprocket assemblies at each end of the peeler. The gasketed pistons closely fit the inner contour of the tube, so that product deposited between pistons is moved along in separate pressure-type chambers.

Speed of product movement in the peeler is controlled by a Reeves variable drive. A single hand-operated valve on the steam line to the peeler provides the only adjustment neces-

* Initially described for our readers on pages 83-85 of Aug. 1947 *Food Industries*, this unit has been turned out by Cleaver-Brooks Co., Milwaukee, under exclusive manufacturing license covering the Douglas McLean patents. It should be noted, however, that current material shortages and pressures of defense work have forced a temporary halt in production of the machine.



3 **ATTENDANT** manipulates variable speed drive to regulate timing of plunger-conveyor traveling through peeler.

4 **TRIMMERS** remove any remaining peel, eyes and blemishes. These fall into flume below trim table.

sary to establish a desired pressure throughout, since pressure of supply steam is automatically controlled. All that is necessary to change the capacity of the unit over a remarkably wide range, is to regulate the speed and steam controls.

It's Done in Seconds

Fork trucked in on pallets in 100-lb. sacks, the potatoes are delivered to the feed station. Dumped onto a rubber belt conveyor, they are elevated and fed into a rotating reel equipped with cold water spray, then go to an immersion washer. From here, potatoes are again elevated by a conveyor and automatically directed into an open shute at the feed end of the peeler.

Passage through the 40-ft. long peeler takes less than 1 min. During transit, the potatoes are subjected to live steam at around 80 lb. pressure, at which steam effectively penetrates and loosens the skin. In the final pressure-tight chamber at the discharge end of the peeler, a cold water spray, at 150 lb. pressure, is substituted for steam. The vacuum that is produced cracks the skin before the product leaves the peeler.

Trim Table Design

From the peeler, product tumbles onto a conveyor that feeds a washer having a reel made of expanded metal. In this unit, cold water sprays, also at 150 lb. pressure, knock off the skins and other surface defects.

Peeled and washed potatoes are delivered by belt conveyor to a trimming assembly designed by Gerber engineers. Arrangement of this all-stainless equipment, which will seat 20 women, is both functional and unique. Atop the 20 stations, one for each worker, is an endless conveyor that supplies potatoes through hand operated gates into each trimmer's bin. A continuous water sluice running along the trim table carries off whatever peel and waste material is removed from the potatoes.

When 20 trimmers are at work, 2 men are necessary to service the trimming stations. They keep supply bins full. They also periodically dump finished potatoes, placed in an adjacent bin by trimmers, onto a belt below the stations. This conveyor feeds the processing area located on the floor above.

When running at full tilt, the preparation line will handle about 5 tons of potatoes per hour, and as much as 8 tons of squash. Number of trimmers varies with the kind of crop and its condition. Removal of deep eyes when potatoes are peeled is a major chore. Only thing left on beets after peeling are tops. As the season progresses and crops become heavy, a parallel trimming set-up employing 20 additional trimmers is put into service. The continuous peeler easily handles the increased load. It is only necessary to speed it up to meet added production demands.

Problems Licked

Results achieved with the continuous pressure peeler were an improvement from the start. The unit's simplicity and flexibility produced gains in both peeled-product quality and production volume.

But the very simplicity of the machine's design initially created a few mechanical problems—since licked by the manufacturer and by Gerber's ingenuity.

For one thing, a particular advantage of the machine is that no lubrication, which might damage the product, is required. However, absence of lubrication placed an abnormal strain on the machine. As close-fitting gaskets expanded through use, they tightened up in their passage through the tube, thereby causing excessive vibration in the drive. But this quiver was readily minimized by adding a ½-in. steel plate on top of the ¼-in. motor drive base.

Another problem involved a gradual loosening of the endless-piston chain. This was found to be due to a galling of the link-bolt retaining-hole in the piston. When cold-roll soft iron pins (which could not eat into the retaining metal) replaced former pins, galling was avoided.

The peeler unit at Gerber's has been notably free from major machine jamming problems. The company, however, is well prepared against emergencies, having installed GE overload relays that are set to kick out at 14 amp. and stop the peeler motor if any abnormal strain occurs.

Steam peeling is considered advantageous over other methods. Abrasive peeling is practical for small operations. Use of brine or lye though effective, entails problem of solution concentration.

How a Few Easy-to-Use Tank Markers

Solve Brine Makeup Problems

Unskilled workers can accurately prepare dilute salt solutions with aid of special level marks on tanks or paddles. Volumetric principles employed

DALE W. KAUFMANN
Chemical Engineer, International Salt Co., Inc., Buffalo, N. Y.

Large batches of accurately formulated salt solutions may rapidly be prepared by using a simple volumetric dilution system. This system easily can be installed by plant people and operated by unskilled workers.

Instruments are not required in any of the measurements. Anyone able to read a target gage correctly can quickly be shown the mechanics of the method.

The only requisites are:

1. Availability of a fully saturated salt solution (must be 100 percent).
2. Constant cross-sectional area in the make-up tanks.
3. Specially marked paddles for the tanks—a different paddle or series of markings for each final solution strength. (The markings can be painted on tank walls.)

The system may be applied with almost any soluble salt having a saturation point and a regular solubility curve (preferably flat in the working-temperature range to avoid inaccuracies due to this variable). Here the author tells in detail of how to use the method with sodium chloride brines, but a few calculations will adapt it to other salts.

The older and more common approach is to run water and a saturated (or nearly saturated) solution simultaneously into a tank. As the dilute brine level approaches the tank top, its strength is tested with a salometer. The flow rate of one or both streams then is adjusted to correct for any discrepancies.

This way is open to much criticism because of the possibility of errors in obtaining the final volume, difficulty in reading the salometer, and the risk of carelessness and indifference to a precise measurement (which takes time and care).

The simplest possible volumetric makeup method involves these steps: First, run fully saturated brine into a tank until it is level with a cleat, stainless nail or other marker inside the tank. Then run in enough water to bring the level to a marker at the top of the tank.

If the strong brine is indeed fully saturated, this method of dilution by volume ratio will be precisely accurate for both final strength and volume. It requires no skill, a minimum of attention, and no salometer readings.

If, however, several strengths of brine are made in the same tank, each requiring the same finished volume, separate markers are needed for the saturated-brine levels. And if different final volumes also are required, more markers have to be placed on the tank walls.

How to Determine Levels

The levels at which to place the markings for the saturated brine and finished dilute brine may be calculated or determined by experiment. But by far the easiest way is to use the "Lixate Equivalent" method,* so-called because it was intended for use with the Lixate rock salt dissolver.

The Lixate Equivalent of any volume of dilute brine is that volume of fully saturated brine which contains the same total weight of salt.

According to this concept, every definite volume and strength of brine may be considered as divided into two parts. One part is fully saturated brine in the exact volume necessary to contain all the salt present—this being the equivalent volume. The other part is the amount of dilution water necessary to give the total volume and strength of the resultant brine when the two parts are mixed.

Since one gallon of saturated brine holds 2.6469 lb. of salt, the accurate Lixate Equivalent of any dilute brine is found by dividing the pounds of salt present per gallon by 2.6469. The quotient always is numerically less than 1 and represents that fraction of a gallon of saturated brine containing the same amount of salt as one gallon of the dilute brine under consideration.

For example, one gallon of 60 deg. S. brine contains 1.4744 lb. of salt. Then its Equivalent is $1.4744 \div 2.6469 = 0.5570$.

Note that the Equivalent essentially is a ratio of saturated brine volume to dilute brine volume when each holds the same total weight of salt. Therefore this ratio can apply to cubic feet, liters or any other unit of volume. Further, it is also a depth ratio

* The Lixate Equivalent method, Lixate Dilution Paddle, and Lixate Brine Dilution Tables are all copyrighted by International Salt Co., Inc., and may not be used or published by others without special permission.

Not Just a Pinch of Salt

Any volumetric makeup procedure specifically requires a dependable source of fully saturated 100-deg. salometer brine. For a "nearly" or an "almost" saturated brine, or an "about" 98-deg. brine, is not good enough.

A rock salt dissolver using the principle of self-filtration automatically produces a fully saturated clear brine. It may be connected directly to the dilution tank, or if there are large peak demands, to a saturated-brine storage tank.

A gallon of fully saturated brine has a practically unvarying salt content of 2.6469 lb. throughout the usual range of plant dissolution-water temperatures. There are two reasons: The temperature-solubility curve of salt is almost flat. And the slightly higher solubility at higher temperatures is offset by the expansion of the warmer brine.

Although the salometer reading will change with temperature, the salt content per gallon will not.

applicable to vertical-sided tanks, regardless of tank cross-sectional area or shape.

For example, if a tank is to hold a 10-ft. depth of 60-deg. S. brine (Equivalent = 0.5570), then 10 x 0.5570 = 5.570 ft. depth of saturated brine. The marker for the saturated brine would be 5.57 ft. above the tank bottom, and the one for the finished brine would be at the 10-ft. level. If the tank is to hold 500 gal. of finished brine, then 500 x 0.5570 = 278.5 gal. of saturated brine is needed.

Use of the Lixate Equivalent as a ratio permits extremely rapid calculation of both the depth and volume of saturated brine required for dilution to some definite strength and volume.

High Degree of Accuracy

Accuracy is an important advantage of this volumetric equivalent system. Assume that we have a tank with total liquid depth of 100 in. and that we are using a salometer with a 10-in. scale. The ratio of lengths is 10 to 1. So if the brine strength is controlled by salometer, it will have to be read 10 times as closely as would the brine levels for equivalent accuracy.

What does this mean in controlling brine strength? If a 50-deg. S. brine is wanted (Lixate Equivalent, 0.4557), then 100 in. x 0.4557 = 45.57 in. is the depth of saturated brine required.

Now assume an inaccuracy in reading the tank level marking of plus or minus half an inch. This means the actual brine strength may vary from 49.5 to 50.5 deg. S. No operator can or will read a salometer within ½ deg.—especially including a temperature correction. Further, the inaccuracy of half an inch noted above is probably too large. Use of a contact point or other level-reading device should reduce the error to 0.1 in.—equivalent to a salometer reading of plus or minus 0.1 deg. Such accuracy is far beyond practical requirements, but it illustrates the superiority of the volumetric dilution method in everyday plant use.

Paddle Makes Handy Gage

The above method of calculating tank markings applies only to those tanks which are empty at the start of the makeup procedure. A problem is introduced when the tank already holds varying amounts of dilute brine from the previous mix.

Use of a dilution paddle makes the proportioning of the saturated brine and water as easy as if the tank were entirely empty.

This paddle, which may be made of wood, is illustrated in Fig. 1. Along its left edge is a series of black horizontal depth lines, each connected by a diagonal line to the corresponding horizontal depth line along the right edge. A line at the top of the paddle indicates the liquid height for a full tank.

In use, the dilution paddle may (temporarily or permanently) be held vertically with its lower end on the tank bottom. If the tank is empty, it is filled with saturated brine to mark *K* and diluted with water to mark *G*.

If the tank contains brine from a previous mix, and its level is at mark *M*, for example, enough saturated brine is added to bring the level up to mark *N* (connected to *M* by a diagonal line). Then the brine is diluted with water to bring the level to mark *G*.

To determine the location of the scale markings, the desired brine strength and total exact depth of dilute brine in the filled tank first must be selected. The diameter of the tank is not required. In fact, the same paddle may be used for either round, square or rectangular tanks, as long as the tank area does not change with height.

LIXATE EQUIVALENTS at 60 deg. F.

(Sodium chloride brines)

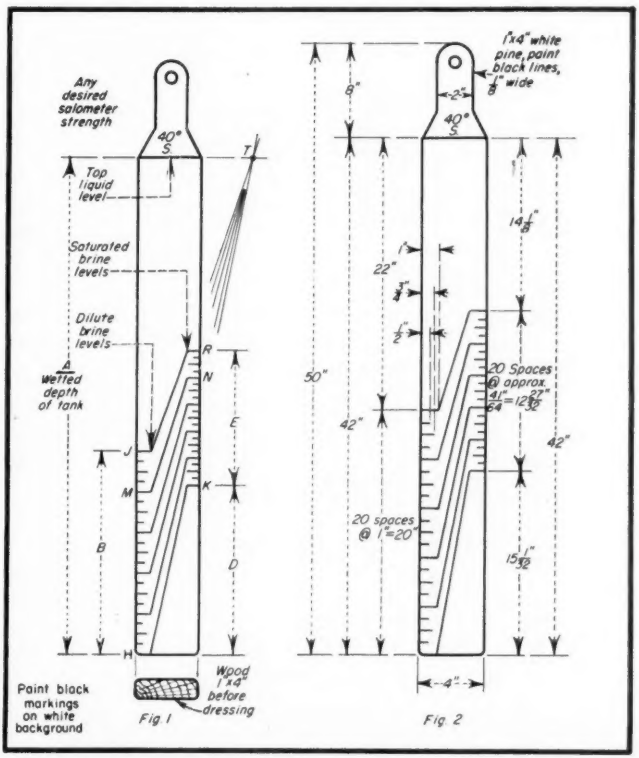
Salometer deg.	Salt (lb. in 1 gal. brine)	Lixate Equiv.
0	0.0000	0.0000
5	0.1110	0.0419
10	0.2240	0.0846
15	0.3392	0.1281
20	0.4565	0.1724
25	0.5759	0.2176
30	0.6975	0.2635
35	0.8214	0.3103
40	0.9474	0.3579
45	1.0758	0.4064
50	1.2063	0.4557
55	1.3392	0.5059
60	1.4744	0.5570
65	1.6120	0.6090
70	1.7521	0.6620
75	1.8948	0.7158
80	2.0400	0.7707
85	2.1877	0.8265
90	2.3380	0.8833
95	2.4908	0.9410
100	2.6469	1.0000

How to Mark Paddle

The method of locating the paddle markings in Fig. 1 is as follows:

1. Distance *A* is the total depth of dilute brine in the filled tank, and is laid off from the bottom of the paddle to mark *G*—the latter being the top liquid level when the lower end of the paddle is resting on the tank bottom.

2. Distance *B* is an arbitrary depth desired, and is marked at point *J*. This often is approximately one-half



PADDLE design for Equivalent system (Fig. 1) and typical paddle dimensions for 40 deg. S. in 3½ ft. tank (Fig. 2).

the total tank depth. It marks the maximum depth of dilute brine which might be remaining at the time of refilling the tank.

3. Distance B is marked off into any desired number of equal parts.

4. Distance D is the depth of saturated brine required for makeup when the tank is entirely empty, and is marked at K. This depth (or volume) of brine must contain the same amount of salt as the dilute brine of depth (or volume) A. Distance D is found by multiplying distance A by the Lixate Equivalent of the dilute brine.

5. Distance E is distance B multiplied by the value 1 minus the Lixate Equivalent. It is divided into the same number of equal parts as distance B, spacing of the parts being less. Compared to those in B, the divisions will be in the ratio 1 minus the Lixate Equivalent to 1.

6. Ends of marks H and K are connected by a diagonal line; likewise, marks J and R. A few of the intermediate marks also are connected, for easy reading. All marks connected by diagonal lines must extend exactly the same distance inward from the paddle edges, and the diagonal lines must start and stop exactly at the mark ends. Unconnected marks may be made variable in length for easy identification.

See Fig. 2 for an illustration of a

What's Behind the Equivalent Dilution Method

The geometric basis for the volumetric dilution procedure utilizing a paddle or special tank markings is straightforward. Also, the derivation of the diagram for various dilution strengths can be worked out quickly and accurately.

Paddle Markings Explained

In part I of the drawing, let vertical distance A represent the total depth or volume of dilute brine in a straight-sided tank. Let vertical distance D represent its Lixate Equivalent. If the tank is filled with saturated brine to point K and then with water to height G, and the liquids mixed, the resultant dilute brine will be the exact strength desired. The Lixate Equivalent may be used as a proportionality factor for any desired depth or volume of dilute brine. Its value is represented by l in the following calculations.

Whenever residual brine is left in a tank which is about to be refilled, the level of this brine theoretically may be considered as the bottom of another empty tank. Assume a residual brine level (or new tank bottom) at J, making a new refillable depth C. Then Cl is the new depth of saturated brine required above new assumed bottom level J, giving a new saturated brine level at R. Water is then added up to level G.

In order to avoid calculation of a large number of saturated brine levels (represented by point R), corresponding to various residual brine levels J, it is much easier to note the relationships between the various depths, as follows:

A = the total depth of dilute brine in the filled tank (fixed).

l = the Lixate Equivalent of the dilute brine (constant with a fixed final dilution strength).

B = the depth of residual dilute brine in tank to be refilled.

$D = Al$; the depth of saturated brine containing the the same amount of salt as the dilute brine of depth A.

$M = Cl$; the depth of saturated brine containing the same amount of salt as the dilute brine of depth C.

Then:

$$A = B + C = D + E + F$$
$$E + F = A - D$$
$$E + F = (B + C)(1 - l) = A(1 - l)$$
$$F = (A - B)(1 - l) = C(1 - l)$$
$$E = A(1 - l) - C(1 - l) = (A - C)(1 - l) = B(1 - l)$$

In actual practice, distances B and E need be determined but once. Point J is selected at a fairly high level, and this fixes point R, since $E = B(1 - l)$. Then distance B is divided into any convenient number of equal parts, and distance E into the same number of parts, although the divisions will be smaller.

How to Layout Markings

There is a very easy method of laying out dilution paddle markings to full scale, or of checking the accuracy of calculated markings. This is due to the fact that the diagonal lines connecting the various points J and R all intersect at a common point. Before proving this, note the procedure for marking a full-size or scale-size dilution paddle by referring to part II of the drawing. The steps are as follows:

1. Draw HG, equal to dilute brine depth.

2. Lay off HK, this being $HG \times l$, l being the Lixate Equivalent of the dilute brine of depth HG.

3. Draw a line through G, at right angles to HG.

4. Lay off HN, in convenient relation to the paddle width.

5. Draw NK and extend it to intersection T on line OGT.

6. Select as many points J as desired along line NO, representing residual dilute brine levels and draw lines JT, all intersecting line OGT at point T.

7. Mark intersections R of lines JT with line HG, these being the respective saturated brine levels for refilling the tank from various levels J.

Geometric Paddle Proof

For proof that all the sloping lines on the dilution diagram meet at a common intersection when extended, refer to part III of the drawing. The lines, points and distances have the same significance as in the previous sketches.

Triangles HKN and GKT are similar. Therefore,

$$a : b = Al : A(1 - l)$$
$$aA(1 - l) = bAl$$
$$aA - aAl = bAl$$
$$aA = aAl + bAl$$
$$a = (a + b)l$$
$$a + b = a/l$$

Note particularly that the distance $(a + b) = a/l$. This distance locates intersection point T in relationship to points O and G, and is dependent solely upon the selected width a and the Lixate Equivalent (the ratio l) of the dilute brine. The location of point T is completely independent of the tank depth or residual brine depth. Therefore, using any residual brine level J, the line JT must pass through the same intersection T, and intersection R will represent the level of the saturated brine to be added to the tank.

Note further that distance $(a + b)$, or OT, may be anything desired. But once selected, distance a and point G

finished paddle designed for a 3½-ft. deep tank, a 40-deg. S. solution, and a 20-in. residual of dilute brine.

Extended diagonal lines will all intersect at point T on extended liquid level line G.

A different paddle is required for each strength of brine and for each depth of tank. Opposite sides of the paddle may be used for different strengths. Line G also may be marked at several levels, corresponding to several strengths of brine, provided the lowest marking does not unduly reduce the tank capacity. A further variation is to arrange the markings so that the water is added first, then the brine.

Instead of placing the markings on a paddle, they may be painted on the inside of the tank. Several sets may be placed thereon, one for each of several different brine strengths and/or volumes.

Note, however, that the desired final brine strength must be the same as the residual brine strength. In no case can the dilution paddles or diagrams be used for mixing brines of two different strengths.

The writer wishes to thank officials of International Salt Co., Inc., for permission to use and publish the copyrighted material herein. He also wishes to thank Mr. J. H. Cain, Jr., for his work on the various diagrams.

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also are set, and may not be convenient in relation to the paddle width. Therefore it is better to select distance a, and let point T fall where it will, rather than conversely. There is no relationship whatever between A and $(a + b)$.

There is a type of dilution diagram which has application when the same tank is to be used for various strengths of brine, and has to be refilled before being completely emptied of the previous mix.

In part IV of the drawing, distance NO is the depth of dilute brine in the filled tank. Point T is at the same level as O, and any convenient distance away. Line NT is drawn, and is the reference line for the residual brine level. Distances NK', NK'', NK''' are the depths of saturated brine required to make up dilute brine of depth NO at strengths 10 deg. S., 20 deg. S., 30 deg. S., up to saturation, and are found by multiplying distance NO by the Lixate Equivalent of the various brine strengths.

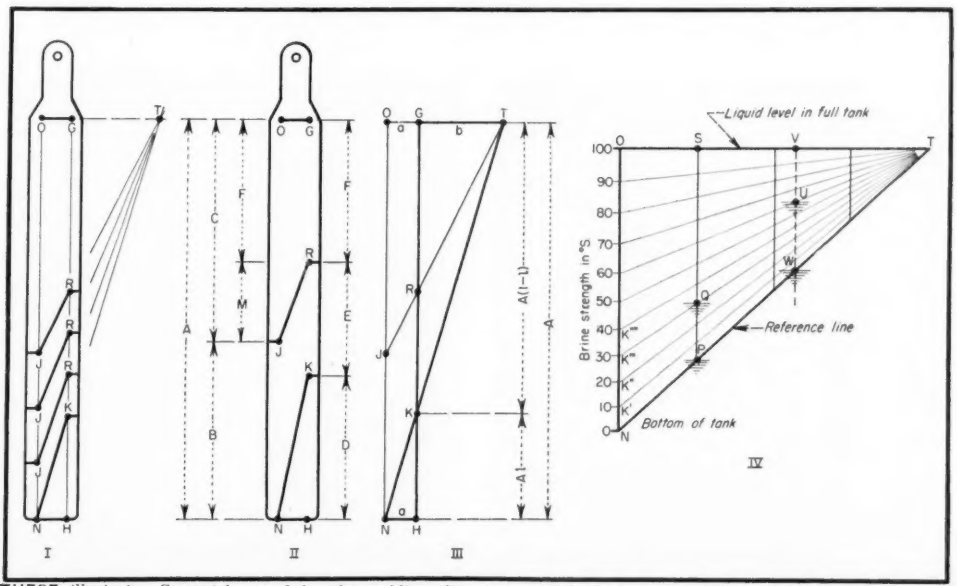
Diagonal lines are drawn from points K', K'', K''', and so forth, to point T. Line OT is divided into any desired number of equal parts and vertical lines drawn. These are merely to facilitate use of the diagram.

The following relationship will hold: Wherever a residual brine level cuts reference line NT, the point vertically above it on the diagonal line, representing the brine strength will mark the level to which saturated brine must be added for refilling the tank.

For example, if the tank is empty and 30-deg S. solution is wanted, saturated brine is added up to level K''', and filled with water to level O. If the tank is partly filled, say, to level P on Reference Line NT, the point Q directly above it on diagonal line $K'''\ T$ marks the level to which saturated brine must be added for dilution to level S. In another example, if the residual level in a tank of 60-deg. S. solution intersects reference line NT at W, saturated brine must be added to level U on the diagonal 60-deg. S. line, vertically above W.

The proof for the relationship is that the diagonal lines intersect all vertical lines parallel to NO at distances proportional to the distances NK', NK'', NK''', on NO. Therefore, the infinite number of residual brine levels intersecting reference line NT may be considered, in effect, as new tank bottoms to be filled with saturated brine up to various levels vertically above said intersections, depending upon the desired dilute brine strength.

Various other types of paddles and diagrams are possible, but the above will serve to show the possibilities inherent in graphical representation of dilute brines and their Lixate Equivalents.



THESE illustrate: Geometric proof for the paddles (I), steps used in laying out a full-sized paddle (II), why the sloping lines converge (III), and use of a dilution diagram for varying solution strengths (IV).

HARD, DURABLE concrete floors like this give optimum service in food processing areas. When properly prepared and finished, concrete can withstand heavy wear and is resistant to chemical action.

Top-Service Concrete Floors

How to Make Them . . . How to Repair Them

The right basic mix is a must, yes—but the care taken in proportioning the water remains the final criterion in getting surfaces affording maximum wear and utility

E. E. ECKERT

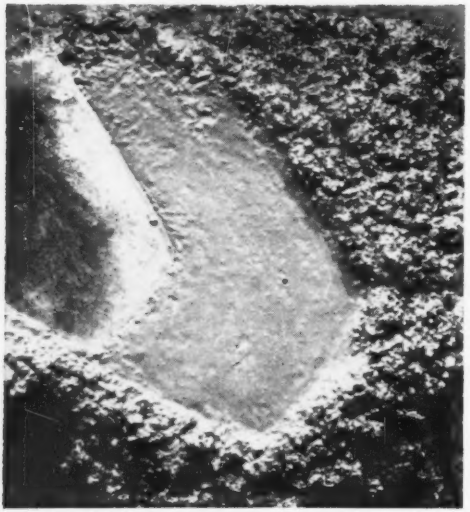
Superintendent of Construction & Engineering, Geo. A. Hormel & Co., Austin, Minn.

Every engineer knows how to get good concrete. But too few extend that "know how" in laying good-surface concrete floors.

The most fundamental ingredient in a floor mixture is not the cement, sand, or gravel—it's the water. No matter how good the other ingredients are, too much water will certainly result in a second-rate concrete flooring, and hence early failure. We do not mean to minimize the importance of tough, well-graded aggregates, but to emphasize the importance of water.

In fact, we have gone to extremes, at Hormel, in assuring a supply of proper aggregate. We are now using a crushed-granite aggregate in a size range giving a dry mix of maximum practical density. The screen analysis

Camera Closeups Show Way to Do Job



1 **SPREADING** a mix having the proper consistency. When "right," concrete can be hand-packed into ball.

2 **BONDING** of a wearing course to a base slab requires the later to be roughened and cleaned, as above.

of this aggregate (100 percent passing 3/8 in. sieve) is:

Percent Passing . . .	. . . Mesh Screen
96	#4
51	#8
13	#16
1.8	#30
5	#50
2	#100

Fineness modulus of the combined aggregate is 4.38, and the density of the mixture is 150.1 lb. per cu. ft.

The grading of the aggregate may vary considerably, depending on the source of supply. But it should be in the range of 100 percent passing 3/8 in. sieve, and 0 to 5 percent passing #4 for coarse ingredient. For fine aggregate, 100 percent should pass #4, 5 to 15 percent should pass #50, and 0 to 5 percent should pass #100.

The ratio of fine to coarse aggregate should be in the range of 2/3 to 1 1/2 parts fine to 1 part coarse, with a resulting fineness modulus of 3.90 to 4.30.

Can Save Through Bagging

All aggregate should be clean, hard, and durable. Good aggregates include crushed granite, trap rock, and dolomite.

Not content to purchase this material in load form, as is common with ordinary concrete aggregates, we arranged to have the material bagged at an additional cost of $2 per ton, feeling that the extra cost of 3/4c. per sq. ft. of floor surface is fully justified. This is done for a practical reason and a psychological one.

The practical reason is that we thus prevent segregation of the material, which normally occurs in a stockpile. Also, we keep out excess moisture, thereby assuring ourselves that every batch of concrete will be mixed exactly alike and will have uniform consistency.

The psychological reason is that this type of handling gives the material a greater importance in the eyes of the workmen, and it increases the chances that it will be handled according to our specific instructions.

As stated, control of water for mixing is most important. For the type of mix being discussed, the mixing water should not exceed 3 1/2 gal. per sack of cement, including any moisture which may be present in the aggregate. This will result in a no-slump concrete containing just enough moisture so that it can be packed into a ball with your hands. The mix should be proportioned to suit the aggregate available so that the cement water paste overfills the voids in the aggregate by about 5 percent.

The material should be mixed for 3 min., in a revolving blade mixer, s ch as a plaster or mortar unit—because the material has a tendency to ball up in the revolving-drum agitators usually used for concrete.

As a matter of interest, this heavy duty floor surfacing mixture will reach a compressive strength in excess of 7,000 lb. per sq. in. in 28 days. It can be used as a monolithic or bonded finish.

When employed as a monolithic finish, it is important to use for the base slab a mix which will not permit excess water to appear at the surface. If this occurs, the excess water will be absorbed by the wearing course, which will thus be greatly reduced in strength and durability.

Blot Up Excess Water

If, in spite of precautions, there is any water gain on the surface of the base slab, the excess water should be removed before the topping is applied. Also, the topping should not be put on until the base course has stiffened sufficiently to avoid scuffing of the finish by workers' feet.

When used as a bonded finish, the base slab in new construction should be struck off 3/4 to 1 in. below final grade. When it has partially hardened, it should be brushed with a stiff-bristled broom to remove all laitance and scum, and to score the surface to provide for a mechanical bond.

Recent tests have shown that superior bonding occurs when the exposed surface is largely clean, coarse mortar. When great percentages of coarse aggregate are exposed, the bond strength is reduced. If repairing an old floor, the surface is chipped out (1 in. deep and cutting the edges square) and then treated in the same way.

A special warning, applying particularly to meat packing establishments, is in order: A bonded surface is likely to fail if the temperature differential between the base slab and the topping mixture exceeds 5 deg. F.

Immediately before placing the topping, the base course should be thoroughly wetted and cleansed by

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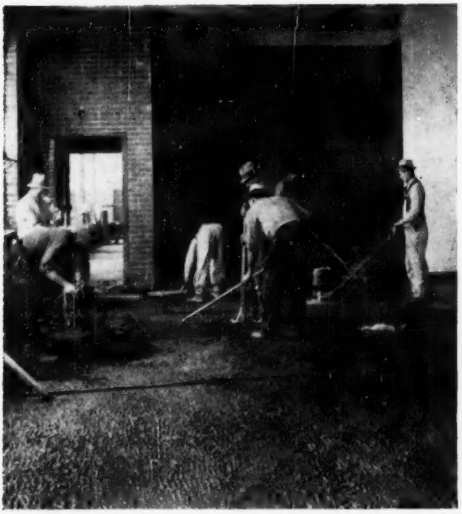


3 SPREADING the mix evenly involves raking, tamping, screeding, and floating of the concrete.

4 SCREEDING comprises scraping away the excess mix with hand boards to bare the metal guide strips (arrows).

scrubbing with clean water and a stiff brush. All surplus water is removed and a wash of cement mortar applied. This wash consists of 1 part cement, 1 part sand, and 4½ gal. of water per bag of cement. It is thoroughly brushed onto the slab with a stiff brush. The cement wash should not be allowed to dry out before the topping is applied.

The topping mixture is placed and spread ¼ in. above the finished floor. You will find that this material can be spread most easily with a common garden rake. It must next be tamped or rolled thoroughly, then screeded to the proper elevation. Special care should be taken to see that all lumps of finish material are broken up and distributed.

Can Toughen With Power

It is almost impossible to finish this type of floor surface without the use of a power float. The kind we use is a Kelly compactor—a disk type with 2 or 4 hammers to beat on the disk. The power float should be used within 30 min. of placing the material, otherwise the finishing procedure will be very difficult.

Power floating should be followed by hand steel troweling to eliminate surface irregularities, and to seal any surface pores. We customarily follow troweling with a fine brush to reduce slipperiness of the finished surface.

Floors have a tendency to show wear first at cold joints, where it's most difficult to obtain thorough compaction. It will pay dividends to be particularly careful at joints.

Cracks which may develop should never be left open. They should be caulked or filled. One method is to caulk the opening with lead wool. Another method, where floors are not subject to grease, is to pour in a hot bituminous rubber sealing compound that will remain somewhat plastic. Such cracks should be a little overfilled, never underfilled.

Just as water is of utmost importance in the proportioning and mixing of concrete, it is also of utmost importance in curing after hardening. The chemical reactions between cement and water which cause concrete to harden will continue indefinitely if moisture is present and temperatures are favorable. For this reason, water for curing should be applied to the new floor surface as soon as possible without marring the finish. It should be kept continuously wet, because the longer the curing time the stronger, harder, and more impervious the concrete. The minimum curing time is seven days.

Frankly, we have not been too successful in keeping large concrete floor surfaces continuously wet for the minimum curing period, since their size poses a particular problem of replacing moisture lost through evaporation. Quick drying stops the hardening reaction and causes loss of strength. And dusting and cracking follow.

We have come to the conclusion that the use of colorless membrane curing compounds is the safest procedure in curing. Although this method is not as efficient as the wet method, it gives good results. The compound may be sprayed on the surface immediately after finishing.

Give Floors a Chance

A final problem in our plant—and we are sure it is not unique with us—concerns the matter of "keeping 'em off." Most operating people seem to believe they should be allowed on a new floor surface or patched area the day after the construction gang moves out. This cannot be allowed. Those who have the responsibility for floor maintenance must be immune to arguments. They should build stout barricades to prevent use of floors until after the curing period.

Now to the subject of cost: Actually, the outlay for this type of heavy duty floor surface is not great. Preparation, mixing, placing, floating, finishing and curing should be accomplished at a cost of about 12 man-hours per 100 sq. ft.

At an average labor rate of $2 per hour, it will cost 24c. per sq. ft. for labor. Materials will run from 8 to 10c. per sq. ft., depending on local prices and freight rates.

The circumstances under which this type of floor can be used must depend on the preferences of plant management and the degree of success experienced in the installation of the heavy duty concrete floor. We have subjected this type of floor to heavy traffic, and to brine spillage, for as long

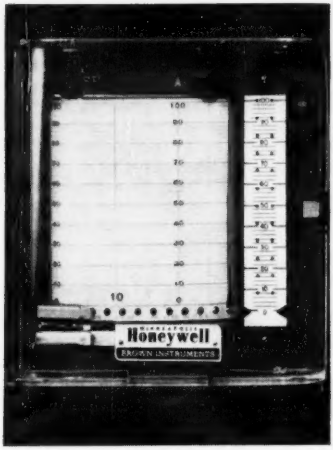
(*Turn to page* 198)

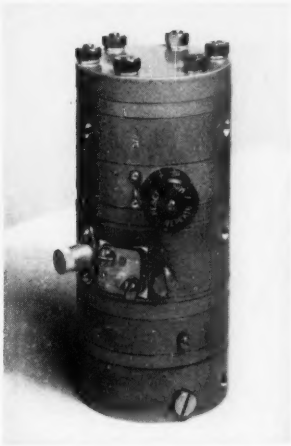
Way to Do Job (Cont'd)

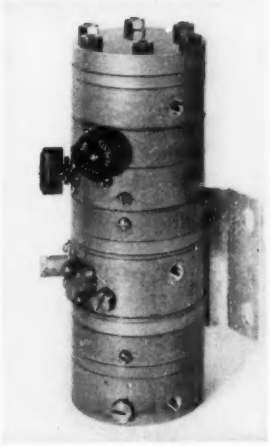
5 **FLOATING** is best accomplished with rotating power disks. Thus, the concrete is compacted and smoothed.

6 **TROWELING** by hand plays an important part in giving the surface a smooth appearance, durable finish.

NEW EQUIPMENT & SUPPLIES







Integrated Control System Is Accurate, Easy to Maintain

Faster and more precise measurement, closer control, and increased convenience of installation and maintenance are reported with use of a new integrated control system for flow and other process variables.

System is comprised of miniature indicator (seen, left above) designed primarily for use on graphic panels, and a new, compact controller unit (center and right photos illustrate two different kinds).

New controllers, known as Tel-O-Set, are available in two types—the fixed band, and the adjustable-proportional band. These units are constructed of a number of coded, interchangeable sections, separated by diaphragms. Air passages are drilled in the various sections. Except for manual adjustments of reset on the fixed band unit, and reset and proportional band in the adjustable unit, controllers operate entirely in response to pneumatic signals.

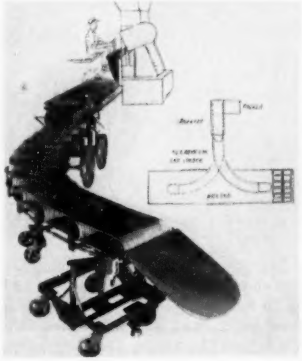
Controller, a fast-acting unit, responds to differences between the two transmitted air pressures which it receives—one corresponding to measured variable and the other to set point—by diaphragm movements which adjust a sensitive flapper-nozzle combination within the controller. Air output from a pilot relay is used to adjust control valve and to modify response of controller itself. Controller continues to readjust output until measured variable pressure is equal to set point pressure.

Fixed band unit is equipped with a single reset adjustment dial. Unit is $6\frac{1}{8}$ in. high and of $3\frac{3}{8}$ in. dia. It weighs approximately 6 lb. Air supply pressure is 20 psi., with output pressure of 3 to 15 psi. Process variable and set point pressures are also 3-15 psi. Proportional band is fixed at 150 percent, with reset adjustable from 0.2 to 100 repeats per minute. An optional integral by-pass relay provides bumpless transfer from automatic to manual operation. A universal bracket is supplied for control room, valve yoke, or structure mounting. A split manifold permits removal of the controller while on manual by-pass.

Adjustable band controller is approximately 9 in. high and of $3\frac{3}{8}$ in. dia. It weighs $8\frac{1}{2}$ lb. when equipped with the by-pass relay. Integral by-pass is optional. Air supply pressure, process variable, and set point pressures are same as on fixed band unit. Proportional band is adjustable between nominal limits of 2 and 150 percent, with reset adjustable from 0.2 to 100 repeats per minute, or from 0.1 to 5 repeats per minute. Unit is equipped with same universal mounting used on fixed band controller.—*Minneapolis-Honeywell Regulator Co., Wayne & Windrin Aves., Philadelphia 44.*

Circle 115A on Reader Service Card

Telescopic Loader Minimizes Labor



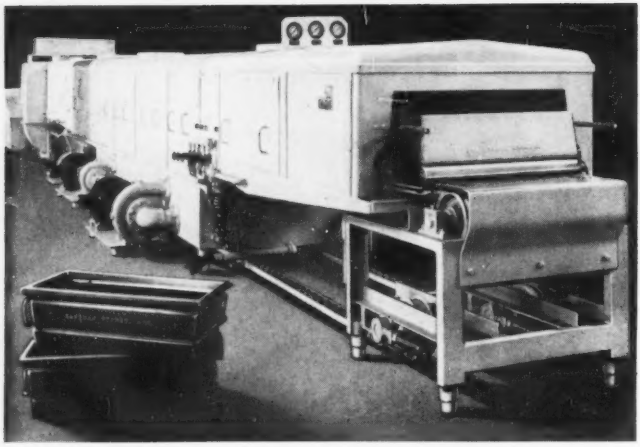
Hand trucking is eliminated with use of a power-driven telescoping box car loader. Operated beneath the bag-filling machine conveyor, it delivers bags right up to the point of loading in box car.

Conveying element consists of a series of endless spring belts that operate over grooved steel rollers. Car loader can be bent (into any curve up to a 90 deg. angle and while under power) to go around box car door and into end of car.

As loading progresses, loader telescopes under packing machine. Conveyor has 30-bag-per-min. capacity.—*Flexveyor Manufacturing Co.*, 1220 *South Acoma St., Denver* 10.

Circle 115B on Reader Service Card

Automatically Cleans, Sterilizes Food Lugs



Machine washes, rinses, sterilizes, dries and applies a light film of oil to lugs as they are conveyed at a rate up to 400 per min. Entire operation is automatic from intake to discharge of completely cleaned and oiled lugs.

Washing, a matter of seconds, is both time saving and sanitary, an important advantage to users of food handling lugs. Modifications of this machine can be easily made for smaller or larger operations or to wash other types of containers used in handling food.

Lugs, placed on the continuous moving chain, go through the following cycle of operations.

Loose soil is first removed from lug by pre-rinse treatment. Here, lug is flushed out with cold water at plant supply pressure. Used pre-rinse water drains to sewer. After pre-rinsing, lugs are drained before passing over washing compartment.

Streams of hot water delivered by large volume, high pressure pumps thoroughly clean lugs inside and outside. This water is re-circulated but is constantly "skimmed" and freshened by addition of overflow from rinse tank. In rinse compartment lugs are rinsed with 200 deg. F. water delivered by another high pressure pump. Water in rinse tank is constantly freshened by addition of used "sterile water."

Last water treatment is sterile rinse with fresh scalding hot water used only once. It is, however, used again in rinse tank and in wash tank.

Following sterile rinse, lugs are thoroughly dried with high pressure air jets.

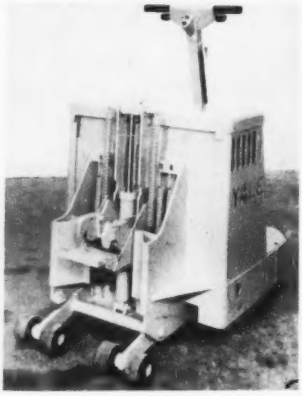
A film of edible oil is applied to inside of lug before it leaves washer. Oil is applied by air through fog type jets with "electric-eye" control.

Tanks are constructed of electrically welded heavy boiler plate. Automatic temperature regulators control water temperature in wash and rinse tanks. All tanks are equipped with dial thermometers. Splash proof motors are standard equipment.—*Rice & Adams Equipment Div., Pressed Steel Car Co., Inc., Buffalo, N. Y.*

Circle 116A on Reader Service Card

Tractor Device Automatically Engages Trailer

Designed to permit operation in very narrow aisles and accurate spotting of loaded trailers, new motorized tractor is built to automatically engage various types of industrial trailers.



It is possible with this unit to engage the end of a caster type trailer and make a right angle turn with center of turn being fixed axle of trailer. This gives shortest steering radius possible.

In operation, motorized tractor (left photo) is driven to end of trailer and a push-button is pressed engaging a hook on tractor with lower side of trailer frame. Hook then pulls trailer into intimate contact with tractor. Next, a pair of secondary hooks (right photo) reach out and grab top part of trailer frame, firmly engaging tractor and trailer.

Finally, trailing wheels of tractor lift off floor so that weight of rear end of tractor is supported on trailer and both form an integral unit. This is all accomplished in a few seconds.

Tractor will operate successfully with almost all caster type trailers having some projection of edge which the gripping mechanism can "take". Called the "Grip-Tow," new unit was invented by George Quayle, Yale's chief engineer for hand and motorized hand lift trucks.—*Philadelphia Div., Yale & Towne Mfg. Co., 11,000 Roosevelt Blvd., Philadelphia 15.*

Circle 116B on Reader Service Card

Pea Combine Speeds Operations, Saves Man-Hours

Vines are picked, and peas harvested ready for processing in one operation with this new pea combine harvester. Obviating the necessity for time-consuming truck and trailer hauling of vines to stationary viners, this new combine performs all harvesting functions, saving valuable hours. Within minutes after harvesting, peas are all set for transportation to the processing plant.

Machine produces completely hulled peas at a minimum rate of 1,000 lb. per hr., approximately twice the rate of the conventional stationary viner. A light farm tractor pulls the combine, the harvester mechanism of which is powered by its own 4-cylinder engine. Moved with ease from field to field, the combine can also be shipped from one area to another, making it possible to use the same machine in following the pea harvest season across the country. Machines may be leased on a tonnage basis, thus reducing the canner's large capital investment in equipment.

In harvesting peas, a rotating lifter reel equipped with steel fingers or tines reaches into the pea vines, feeding them to a pick-up reel located at ground level directly behind. A vertical power-sickle frees those vines not directly in the harvester's path. Jutting tines of pick-up reel pull vines from the earth. Vines are then delivered onto a vertical conveyor and carried to the thrashing section of the machine.

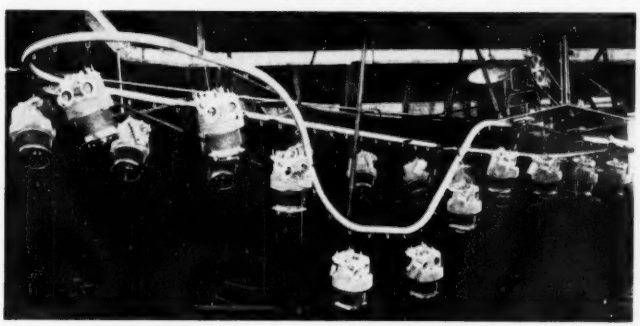
Peas are threshed from the vines as they travel over a series of five tiers of paddles and screens. Pods are broken by action of paddles, freeing peas, which drop onto a conveyor belt below. Blasts of air from two blowers remove any refuse, after which the peas are conveyed to an elevator, thence into perforated pod reels located near top of machine.

Peas drop through perforations into two hoppers fitted with trap door outlets. When hoppers are full, operator riding on harvester platform opens trap doors, allowing peas to settle gently into lug boxes. Boxes are temporarily stacked on platform of harvester and removed to a motor truck at regular intervals to be transported to processing plant. Threshed vines are spread behind harvester by a fan-like mechanism and are later plowed under soil to become fertilizer and mulch.

Only three men are needed to operate the combine: the tractor operator; the man riding the harvester; and a trained mechanic who maintains a fleet of the machines. To harvest and vine the same tonnage with other equipment would require as many as 10 men.—*Food Machinery and Chemical Corp., San Jose, Calif.*

Circle 117A on Reader Service Card

Conveyor Has Fast-Change Sections



This light capacity, power-driven, overhead chain conveyor is reported highly flexible. Its short (15-in.) radius curves and straight track sections are easily combined so that changes or additions as required can be speedily made. To keep maintenance cost at a minimum, complicated and fast-wearing parts are reported eliminated.

Known as Chain-Veyor, it will handle loads up to 30 lb. on each pendant spaced at 6-in. intervals or, 60 lb. loads can be carried at 12-in. intervals when supported by two pendants fitted with cross bar attachment.

A special sprocket-type drive is used to distribute chain stresses and afford a straight line pull. Operation in either direction is permissible. Mounting is made at any 90-deg. corner.

Instant adjustment of conveyor speeds from 3- to 9-ft. per min. while the unit is in operation is made possible by variable speed drive.

Bronze universal joints have been placed at 3-in. intervals and, to assure equal wheel loading regardless of the direction of the chain pull, load wheels are mounted at a 45-deg. angle to the load pendant and at a 90-deg. angle to each other. Lifetime lubrication is provided by "Oilite" bearings.

Available now on immediate delivery, unit is shipped knocked down with complete instructions for assembly.—*Southern Engineering Co., Inc., 349 N. First Street, Burbank, Calif.*

Circle 117B on Reader Service Card

HARD TO BELIEVE?

Unless you see the Leaning Tower of Pisa for yourself, you might find it hard to believe that a tower 181 feet tall could lean 16 feet off the perpendicular and still stand for six hundred years.

And unless you see Patapar Vegetable Parchment and test it for yourself, you might find it hard to believe that paper can remain strong when wet, be boiled and stay beautiful, and resist penetration of fats, grease, oils.

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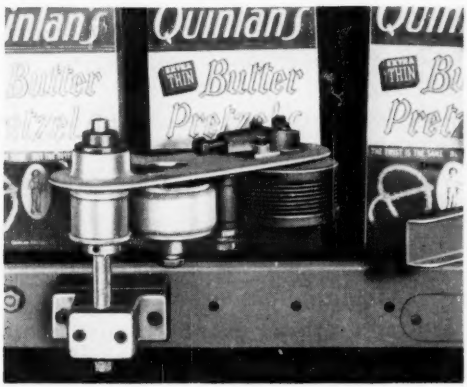
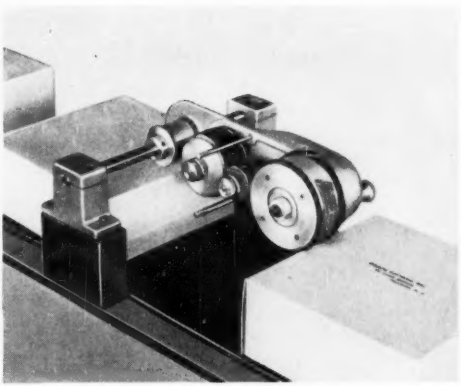
HI-WET-STRENGTH
GREASE-RESISTING PARCHMENT

Unit Puts Spot-Registered Imprints on Cartons





This new, compact, friction-powered production-line attachment produces spot-registered imprints of code-dates, weights, sizes, flavors and other supplementary information on small-size cartons.

Rolacoder No. 401, is easy to install, constructed for long-life performance and is suitable for imprinting cans, canisters and bottles.

Legends containing up to four lines of copy (occupying a maximum depth of 1-in. and a maximum length of 5-in.) may be imprinted on top or side of cartons as they pass through cartoner or sealer, or along a chain or belt conveyor. Unit makes a single accurately located imprint in any designated spot on cartons whose imprint side measures between $1\frac{3}{4}$-in. and $6\frac{3}{4}$-in. in the dimension parallel to direction of package travel.

Feature of machine is Metalok typeholder reported to lock the interchangeable rubber type securely in place so it cannot move out of position during use. Holder consists of a series of concentric metal rings which, opened by key, accept or release type when copy changes are necessary, and are locked tight to grip type when in operation.

Another feature is a twin-roll inking system that transfers a thin-film of ink to type surface.

Normally, unit is pre-set at factory for cartons of specific size. However, when desired, it may be obtained with interchangeable cams that permit user to modify machine action within machine's max-min. range.—*Adolph Gottscho, Inc., Hillside 5, N. J.*

Circle 119A on Reader Service Card

Pilot-Plant Pulverizer Is Simply Installed

This Pulvette (photo), newest and smallest member of Pulva-Sizer family, is installed by simply plugging its extension cord into the lighting circuit. Equipped with either $\frac{3}{4}$- or 1-hp. motor, unit is stated to be an ideal pulverizer for small production or pilot plant or laboratory work.

The unique and effective feed device incorporates a Syntron unit to vibrate the feed hopper and trough. This action gives an even flow into the mills, eliminating bridging and arching. Control of feed rate from zero to maximum capacity of pulverizer is obtained by simply turning a rheostat button.

Capacity will vary, depending on fineness of product desired and hardness or toughness of the material being ground. As a typical example, ordinary granulated sugar can be ground at rate of 75 to 100 lb. per hr., to fineness of 99 percent through 100 mesh.

It is stated that unit will deliver same fineness of grind and same type of product as larger pulverizers. Hence, commercial results can be determined, states maker, from its use in laboratory or pilot plant work.

Pulvette is constructed for continuous 24-hr. service. Normally furnished in gray iron or steel, it is available in stainless steel, bronze, aluminum or other usual metals of construction. It is termed easy to clean, dismantling taking only a few minutes. All parts of grinding chamber are machined, presenting a smooth surface for rapid cleaning. Rotor is of one piece construction, with Stellite tipped wearing edges. It is reversible.—*Pulva Corp., 550 High St., Perth Amboy.*

Circle 119B on Reader Service Card

Want More Information?

It's free—and easy to get. Simply note here the items on which you want more details, then turn to the Reader Service Section inside the back cover, where all are listed by pages and by subjects under, "Editorial: New Equipment, Supplies"—each one with a page key number after it. The key numbers also appear on the handy Reader Service postcard. So you circle those for the items that interest you, sign at the bottom, and mail. No postage is needed.

Why "MARINE QUALITY" Plywood

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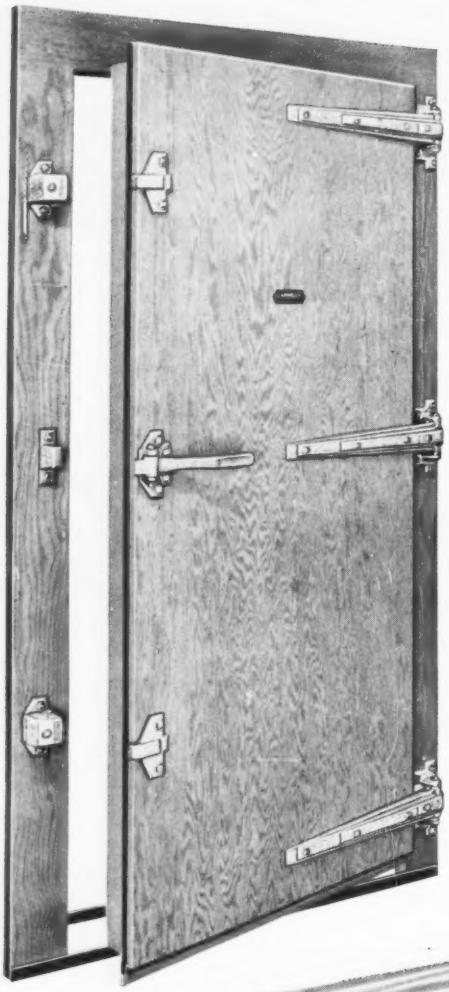
makes Series "50" the finest cold storage door ever built



PLASTIC BOND GIVES EXTRA STRENGTH

Synthetic resin bond used between all plies. Uniform strength of bond and stress equalization assured by hot pressing and tempering after setting.

INSOLUBLE PLASTIC MAKES BOND WATERPROOF

SOAK IT

Passes test of alternate soaking 16 hours and drying 8 hours, repeated three times without affecting bond.

BOIL IT

Plastic bond passes four-hour boil test without any separation at plies.

PLASTIC BONDING IMPROVES SANITATION

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Monopanel Construction of Series "50" Doors Gives You These Other Advantages

- **Smooth One-Piece Panels**—Look better, easier to keep clean.
- **7 Times Stronger**—By test compared with horizontal sheathing. Cross lamination of plies distributes strength equally in both directions.
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- **Rugged Adjustable Hardware**—E-Z-Open TWO Point Fastener and Adjustoflex hinges specially developed by Jamison to maintain uniform gasket pressure.
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JAMISON

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For details and dimensions request Jamison Catalog No. 3. Jamison Cold Storage Door Company, Hagerstown, Md., U.S.A.

Rubber Frame Goggles Are Gas-Tight

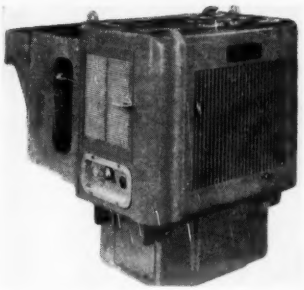
For protection against gas, fume and smoke hazards, a new rubber frame gas tight goggle is being marketed.

To prevent infiltration of air, goggle is fitted, constructed without ventilation slots, and is so designed that the headband enters slots in the outer goggle frame and not through a slit in the lens. Screwheaded bolts on goggle's front are made of non-corroding stainless steel.

Goggles may be obtained in combination with R2000 and R5000 respirators.—*American Optical Co., Southbridge, Mass.*

Circle 121A on Reader Service Card

Truck Gas-Refrigerator Has Electric Plug-In



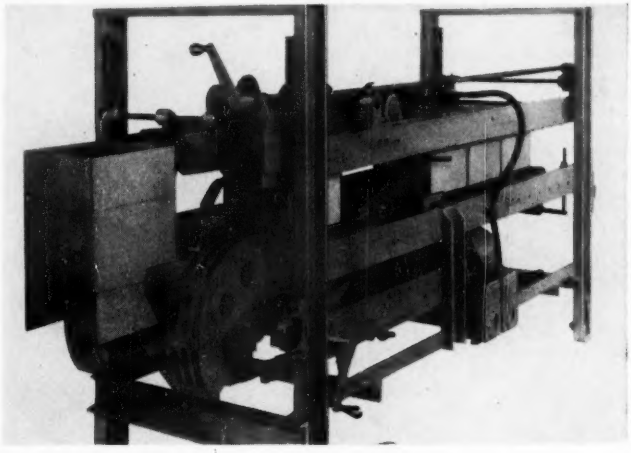
Model K-20, one of a new series of truck refrigerator units recently introduced, operates on gas engine power while on the highway, electrically when trailer is at dock. Change-over from one type of power to other is made by snapping a switch.

New model is a one piece, factory-packaged mechanical unit that mounts halfway through nose of trailer. Operation is fully automatic and independent of truck. Five models offering a variety of services make up new series. Model K-10, weighing 705 lb., is powered by gas engine and provides cooling. Model K-30 is also powered by gas engine but offers both cooling and heating. Other models are available for special requirements.

Through use of larger refrigeration coils and new aluminum compressor, a capacity greater than that of preceding comparable model has been achieved. Another new feature is a hot-gas defrost system that turns itself off when defrosting has been completed.—*U. S. Thermo Control Co., 44 S. 12th St., Minneapolis 3, Minn.*

Circle 121B on Reader Service Card

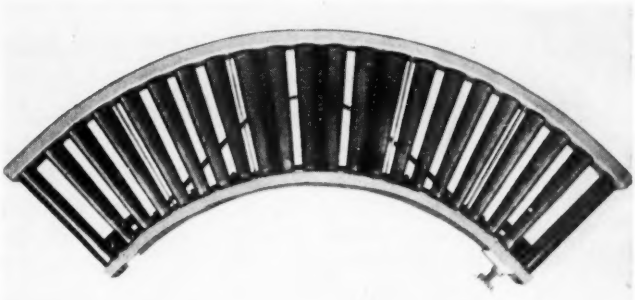
Case Sealer Avoids Carton-Jamming



COMPLETE new flight chain construction on this "Junior" case sealer is stated to virtually eliminate jamming of cartons. New sealer is considerably shorter and narrower. Unit is easily adjustable and will handle a wide range of cartons. Three models, L (illustrated), and M, and N, are available for present delivery.—*A-B-C Packaging Machine Corp., P.O. Box 45, Quincy, Ill.*

Circle 121C on Reader Service Card

New Roller Curve Provides Improved Handling



Difficulties in conveying boxes, cartons and packages around curves is overcome with this new 90 degree, power-roller curve conveyor recently developed.

Basic design differs from other similar movers, in that the new curve unit (patent applied for) uses tapered rollers which provide efficient package control with no skewing or jamming action and a simple V-belt drive that is stated to assure quiet smooth operation with low maintenance cost. And belt drive requires no oiling and can be readily removed without use of special tools and without dismantling the conveyor.

Power driving V-belt is provided from an individual motor or from an adjacent conveyor. Heavy-duty V-belt, which provides friction drive to lower side of tapered rollers, rides in precision sheaves mounted to guide it around arc of curve. These sheaves, with oilless bushings, are strategically placed to maintain pressure against the load rollers, assuring positive drive. Tension of belt is easily and quickly regulated.—*The Alvey-Ferguson Co., 75 Disney St., Cincinnati.*

Circle 121D on Reader Service Card

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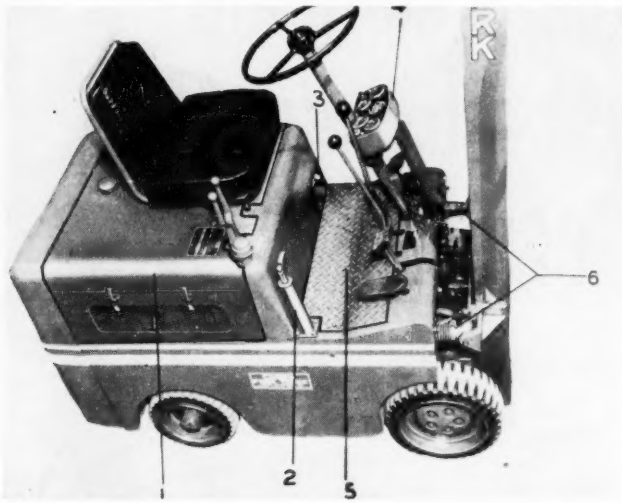


Easier accessibility to the engine compartment, a new type parking brake, an instrument panel mounted on the steering column, and easier steering are features reported for the improved gas Clipper industrial truck.

To remove hood—(1) in illustration—and seat to get to the engine, it is necessary only to remove radiator cap and air breather cap. Louvers on both sides hinge at bottom and fold down to expose engine compartment for simple adjustments.

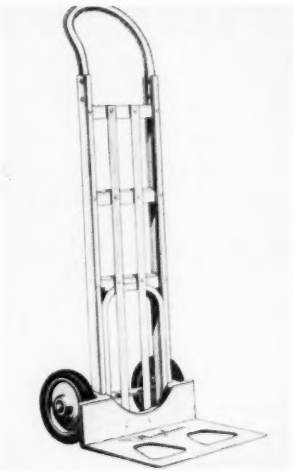
Instrument panel (4), now standard equipment on all trucks, is mounted for full visibility from driver's seat. Recessed into dash on new models is protectoseal gas cap (3), completely outside of engine compartment to reduce fire hazard from spilled gasoline. New pull-type brake (2) is at extreme corner of floor board, clearing center area of one-piece floor plate (5) to allow operator greater freedom.

"No-Kick-Back" steering is achieved by use of an Elliot-type axle with tie rods in same plane and more nearly in line with forces they transmit, plus relocation of steering knuckles, close as practical to the tire's dead-center shock point. Better riding is aim of cushion tires on all models and rubber torsional bushings at pivot mounting points. Redesigned of double cylinder tilt system (6) is to give better upright stability, with a more positive control of tilt.

A "quick-change" clutch has been adapted to minimize "down time" if changing becomes necessary. Unscrewing of two bolts and disengaging of the accelerator pedal allows fast accessibility to clutch housing.—*Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.*

Circle 123A on Reader Service Card

Hand Truck Features "No-Bind" Nose Unit

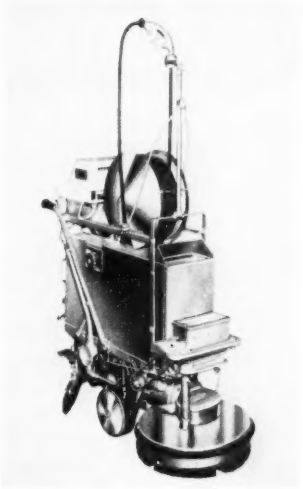


This lightweight magnesium hand truck incorporates a redesigned nose unit extending beyond the wheel on either side, thus eliminating the possibility of flexible loads binding on the tires.

Also featured is addition of two magnesium strips along the frame member. The truck is thereby able to handle both large and small package units with equal facility.—*Magline, Inc., Pinconning, Mich.*

Circle 123B on Reader Service Card

Does Fast, Thorough Job In Scrubbing Floors



This combination scrubber-dryer is designed to mechanically apply a cleanser, scrub, rinse and pick up—all in one operation.

Designated Model 418P, it is reported to clean 3,000 to 4,000 sq. ft. per hr., with considerable savings over mopping claimed, since labor approximates 90 percent of scrubbing costs and materials 10 percent.

Speed of the machine (up to 136 ft. per min.) is controlled at any rate by slight pressure of the hand on the clutch lever. Water, powder, soap and vacuum controls are in easy reach.

Brush ring, comprised of five sectional brushes, has overall dia. of 18 in. Its speed is 175 rpm. Brush motor is $\frac{3}{4}$ hp.

Dimensions are: Length of entire unit, 50-in.; height of top of reel, 48-in.; net weight without powder dispenser, 450 lb. Finish is paint and chrome.—*Finnell System, Inc., Elkhart, Ind.*

Circle 123C on Reader Service Card

"Stretches cloth life with just a handful of CELITE"

From a Celite Field Engineer's report on apple pressing

"THE FOREMAN of this apple pressing plant in my territory is well satisfied with the benefits obtained since they began to sprinkle a handful of a Celite* Pressing Aid on the cloths before pressing.

"Now when the cloths are opened up, the cake snaps out cleanly—they no longer have to beat them with sticks to remove the pomace. Washing is required less frequently, with the net result that cloth life has been greatly increased."

• • •

Longer cloth life is one of several money-saving reasons why more and more fruit processors are using Celite Pressing Aids. Faster production, clearer juice and higher yields are other important benefits that are obtained when these diatomite powders are added in small amounts to the pulp before pressing.

HOW CELITE PRESSING AIDS WORK

The tiny Celite particles, open and porous in structure, interpose themselves between the particles of solid pulp matter. This opens up countless minute channels through which the juice can escape, freely and at lower pressure. More juice is thus extracted in less time. The drier cake is more easily removed and the cloths can often be re-used without washing.

Celite Pressing Aids are used with practically all types of fruit products. No special equipment is needed and the benefits they assure will usually more than pay for the small amounts of powder required.

IF YOU FILTER

Celite Filter Aids can bring you corresponding benefits in faster production, sparklingly clear juices, longer filtration cycles. They are available in 9 grades of particle fineness, each designed for a special filtering requirement. A Celite Engineer will be glad to give you all the facts.

*Reg. U. S. Pat. Off.

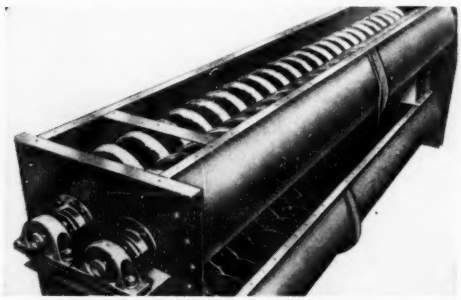
For further information, write Johns-Manville, Box 290, New York 16, N. Y.

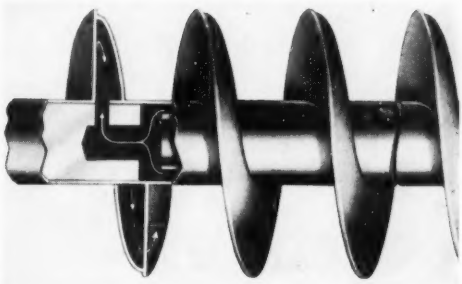
JOHNS MANVILLE JM PRODUCTS

Johns-Manville CELITE

PRESSING AIDS

Hollow Flight Unit Has High Heat-Transfer Rate





Many unique advantages in various types of cooling and heating applications in processing are reported with use of a new type heat-exchanger.

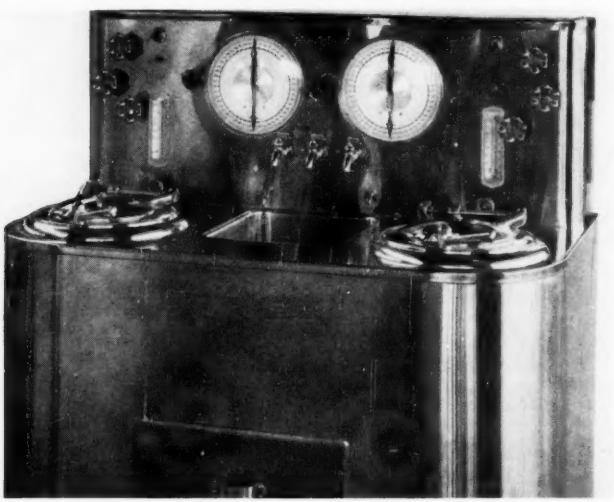
Known as the Holo-Flite Processor, new unit consists, basically, of two or more hollow intermeshing conveyor screws rotating in a trough or tube. Heat-transfer agent circulates through the hollow flights and shafts of the conveyor screws while the product itself "flows" in the trough where it is constantly rotated into, around, over and under the moving heat-exchange surfaces. Continuous mixing, turning action causes a constant change of contact with the heat-exchange surfaces and results in a high rate of heat transfer. Action is stated to be so gentle that dusting is eliminated and abrasion of crystalline particles minimized.

New unit handles, with equal ease, a wide range of products—fine grained, crystalline or powdered solids, pulps, pastes and slurries. Heat-transfer agent can be refrigerant (cooled or ambient water) or other fluid which provides a wide range of processing temperatures. Further, because of its large active heat-transfer surface per cu. ft. of space required, the unit requires only a minimum of space.

Operating principle minimizes power requirements as the conveyor screws rotate very slowly—usually only 1 to 12 rpm. In addition, multiple tiers of units can be driven from one motor, further reducing power consumption. Continuous slow rotation of conveyor screws permits steady flow rather than batch processing.—*Western Precipitation Corp., 1016 W. Ninth St., Los Angeles 15.*

Circle 125A on Reader Service Card

Yeast-Mix Cabinet Cuts Labor, Ups Quality



Man-hour savings and sanitary advantages are claimed with this new Yeast-O-Lator cabinet designed for large or medium size bread plants.

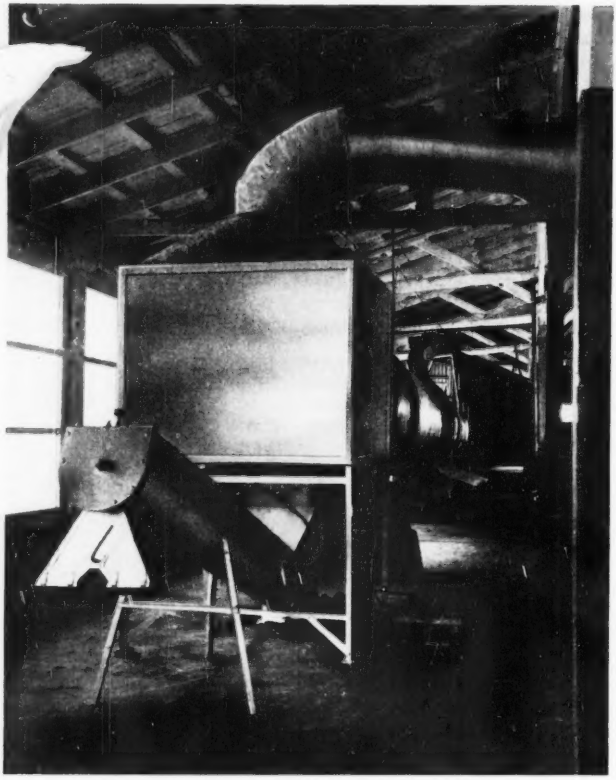
In one compact unit, cabinet combines two water meters, two yeast units, a sink and drawer. Easy to operate and keep clean, unit is shipped fully assembled, the cabinet ready for connection to utilities, drain and to the dough mixers. Several mixers can be served from the same unit through a series of valves and piping.

Unit was originally designed to simplify and assure thorough mixing of yeast, malt and enrichment tablets, before combining with other ingredients in the dough mixer. Bakers have reported this premixing produces more uniform dough thus resulting in a better loaf of bread.

Pre-mixing process ends the tedious work of blending in a container and eliminates the possibility of spillage and waste. Each batch is flushed into the meter in a closed pipe system. Wherever material comes in contact with metal, stainless steel is used to avoid contamination and to retard corrosion.—*Maine Machine Works, 1230 E. 109th St., Los Angeles 59.*

Circle 125B on Reader Service Card

EXTRA PROFITS... THROUGH MODERN DRYING



Sweet Potatoes for Example...

Douglas Warriner of Warriner Products Company writes: "... the Standard-Hersey dryer we purchased in 1940 has *operated very satisfactorily through the years*, dehydrating shredded sweet potatoes which are a by-product of our canning and shipping operations. The raw product upon entering the dryer has an average moisture content of approximately 72%. Moisture content of the dehydrated material ranges from 9% to 14%, averaging about 11%."

Whether your problem is the development of a more efficient method to dry your principal product or, like Warriner's, the recovery of a by-product which otherwise would be wasted, consult Standard-Hersey.

Standard's unparalleled fund of dryer knowledge gained from more than 80 years of experience is at your command — PLUS advanced engineering techniques and dryer fabricating facilities second to none in America. For profitable drying, see Standard first.

Standard-Hersey Rotary Dryer which has been operating since 1940 in the Warriner Products Company, Inc. plant, St. Francisville, Louisiana. Dehydrates shredded sweet potatoes (from culls and trimmings) — 1500 to 2000 pounds per hour. Operates 24 hours a day during 6-month fall and winter canning season.

STANDARD HERSEY Dryers

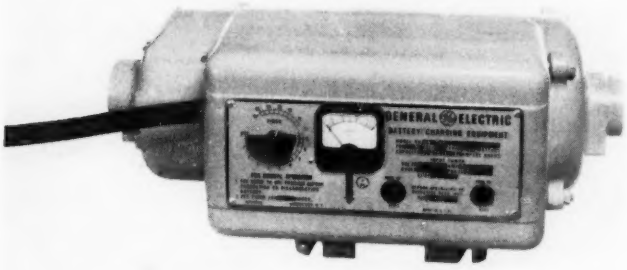
Write for New 12-page Dryer Bulletin

Describes the more than 30 types of Standard-Hersey Dryers, Kilns, Coolers, and Calciners for every process industry need. Explains advanced "pilot" drying techniques to assure most economical selection of dehydrating equipment best suited to each individual product. *Fully illustrated — Bulletin No. 508.*

STANDARD STEEL CORPORATION

5045 Boyle Avenue, Los Angeles 58 • 123-45 Newbury Street, Boston 16

Compact Battery-Charger Can be Mounted on Shelf



Floor space is conserved with use of a new motor-generator type battery charger that can be readily mounted on a balcony or shelf.

For charging batteries in driver-lead and small driver-ride industrial lift trucks, the new unit accommodates lead-acid batteries of 6-19 cells and nickel-iron-alkaline batteries of 10-30 cells. Unit is about the size of a tank type vacuum cleaner, has a control box mounted on its side, weighs only 190 lb., and can be installed on a shelf measuring 6¾ x 8¼-in.

Maker's engineers state fully automatic unit is simple to operate because it is only necessary to plug it in and set the timer, automatic controls doing the rest. Voltage (based on number of battery cells) and current (based on amp.-hr. battery ratings) are adjustable.

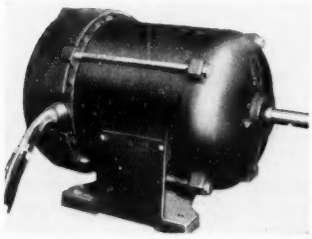
Protection from external damage is provided by completely enclosed construction. Maintenance, when necessary, is simplified by easy accessibility of control parts, commutator, and brushes. Mounting feet are integrally cast with intermediate frame—no special foundation being required. Permanent bearing alignment, established by factory assembly, cannot be disturbed during mounting.

Incorporated in design of new unit are many features recommended by the Industrial Truck Assn. Included are following automatic actions: Disconnection of charger from power line and opening of charging circuit in case of power interruption, re-start of charger upon resumption of power supply following an interruption, control of charging rate under the modified constant voltage charging system, and cutoff of battery and shutdown of charger when battery is fully charged.

The single-circuit equipment operates on 3-phase, 60-cycle, a.c. power. There is generator-overload and motor-overload protection against excessive currents.—*General Electric, Schenectady 5, N. Y.*

Circle 127A on Reader Service Card

Motor Resists Dirt, Grit, Moisture



The TriClad line of single-phase capacitor motors has been extended to include totally enclosed fan-cooled construction units.

In the new design, starting capacitors and switch are mounted within the frame to provide maximum protection with minimum space requirements.

Available in ratings of 1, 1½, 2, 3, and 5 hp., the new line was developed for use where severe conditions of dirt, grit, or moisture are encountered.

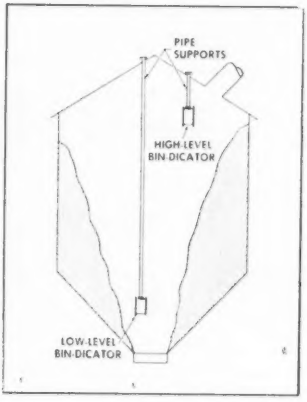
Of cast iron construction, new motors feature standard protection against physical damage, electrical breakdown, and operating wear and tear. Being capacitor motors, they have no brushes or commutators to cause interference with radio or television reception.

Motors have cast-aluminum squirrel-cage rotors, and the long-life ball bearings employed are of the type that will run for years without attention. Easily access-ible grease fittings simplify relubrication when it does become necessary.

Except for the 5 hp. size, which uses 230v. only, new motors operate on 115/230v., 60 cycle power supply.—*General Electric Co., Schenectady, 5.*

Circle 127B on Reader Service Card

Checks Material Levels In Large Size Bins



Dependable level indication in large bins is reported with a new bin-level indicator.

Unit, known as Model CS, is designed for suspended installation. It can be located any place in bin where there will be a free flow of material to and away from the diaphragm. This flexibility of location permits application of unit in materials which tend to build up on walls of bin and to flow down through central area only. Under these and similar conditions, indicators mounted on bin wall couldn't function properly. But new unit, mounted in area of moving material, is stated to give dependable indication of high and low levels.

Unit is designed to be drilled and tapped to take any size pipe up to 2 in. Support pipe also accommodates electrical wiring, making conduit unnecessary. Mounted in this manner, indicator can be easily moved up or down in bin to operate at different levels, or be lifted out for inspection. —*The Bin-Dicator Co., 13946-77 Kercheval, Detroit 15.*

Circle 127C on Reader Service Card

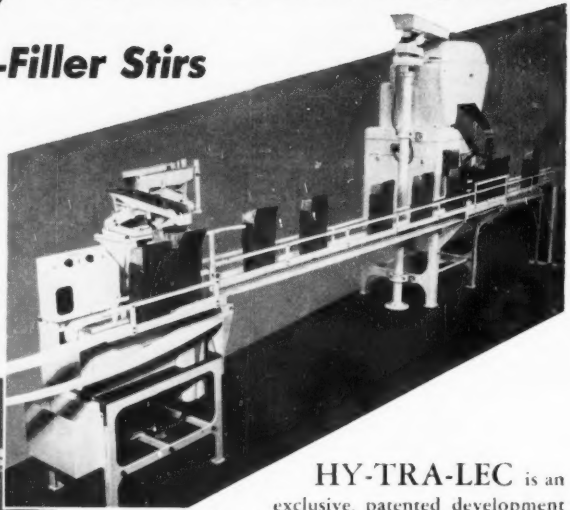
Hy-Tra-Lec

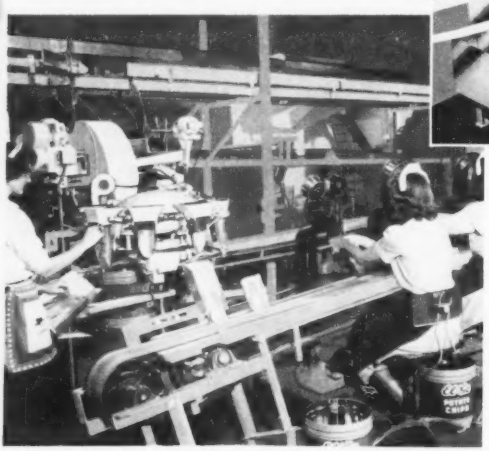
Winning Attention!

NEW TYPE Weigher-Filler Stirs Packaging Industry

More than 300 packagers of dry products have changed to Wright's Hy-Tra-Lec weighing-filling machines within the past five years. Biggest users are makers of cookies, crackers, potato chips and like products, candies, and a variety of foods.

Keep pace with competition. Investigate the cost-saving possibilities of Hy-Tra-Lec in your plant. Write now for latest literature.





HY-TRA-LEC is an exclusive, patented development utilizing the principle of "positive displacement" rather than beam or spring scales. Its chief advantages are accuracy at high speed . . . gentle product handling . . . and dependability.

Weight range is one-half ounce to 16 ounces. Weighing and discharge is automatic. Bags are handled manually. Rigid containers can be handled manually or automatically.

WRIGHT MACHINERY COMPANY

EST. 1893 · 333 CALVIN ST., DURHAM, N. C.
SUBSIDIARY OF THE SPERRY CORPORATION

COMPANY SALES OFFICES: JERSEY CITY · BOSTON · DURHAM KING & ANDERSON, SAN FRANCISCO
EDWIN F. DeLINE COMPANY, DENVER R. P. ANDERSON COMPANY, DALLAS SPERRY GYROSCOPE COMPANY, LTD., LONDON

New Stacker Needs Less Aisle Space

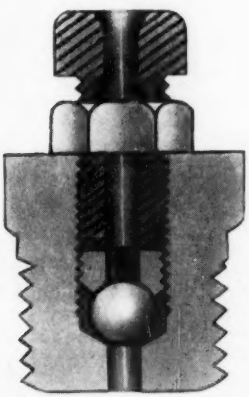
Development of a retractable lift mechanism has made possible the use of this driver-led industrial truck in aisles just 6 ft. wide.

In operation, the new battery-driven unit, called the Transtacker, is first moved into the desired position for picking up a load. The forks are then raised to the proper height, and a button is pressed to move the forks toward the load and into the pallet. This completed, the load is raised a few inches, and another button brings retraction of the entire upright section. Thus working space saved is comparable to the full length of the load.

The Transtacker is 79 in. high, has a telescopic lift of 94 in., and is rated for 1,500-lb., 32-in. loads.—*Automatic Transportation Co., Chicago.*

Circle 129A on Reader Service Card

Valve Used Two Ways—Sampling, Venting



A new double-duty valve is announced that can be used for oils and other liquids, or for venting air into tanks.

Designed principally for employment on oil-immersed electrical equipment such as transformers and regulators, the valve has many applications on a variety of industrial equipment and processing machinery.

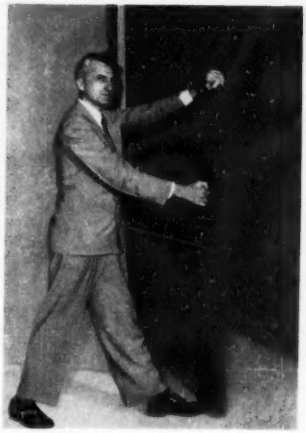
When used for sampling, valve is inserted close to the bottom of the tank of oil or other liquid, permitting samples to be drawn off conveniently. Inserted at top of tank, the same valve can be used for venting air.

The brass valve has a steel ball, inside its body, which is pressed against the seat of an orifice by a conveniently located and easily operated threaded hex bolt. A hex nut on the bolt locks the assembly securely in place. The hex bolt has a hole through the center to permit the passage of liquid to be sampled or air for venting. It also has a cross slot at its end nearest the ball. The valve has a ½-in. male pipe thread for mounting.

When the threaded bolt is backed up, the steel ball is lifted from its seat, allowing liquid to flow past the ball, through the cross slot, and on through the center hole of the bolt for collection for sampling.—*Oil-Rite Corp., 3466 So. 13th St., Milwaukee 15.*

Circle 129B on Reader Service Card

Rubber Swinging Door Is Light, Flexible



Costly maintenance and damage to doors caused by industrial trucks in cold storage warehouses is reported eliminated by this light, flexible, swinging, rubber door.

New door is stated to swing open at a touch, easily absorb shock of trucks, give maximum ease of passage, and return to its normal closed position. Actually, the door is a reinforced air container.

It is constructed of an outer layer of heavy cloth inserted rubber which covers a "frame" of 2 in. rubber tubing. Support and resilience are provided by 15 to 25 inflated rubber bladders specially designed and manufactured by Dewey & Almy Chemical Co., Cambridge. These bladders, running cross-wise inside rubber facing, are positioned between rubber spacers, and are inflated by hand pump through protruding valves.

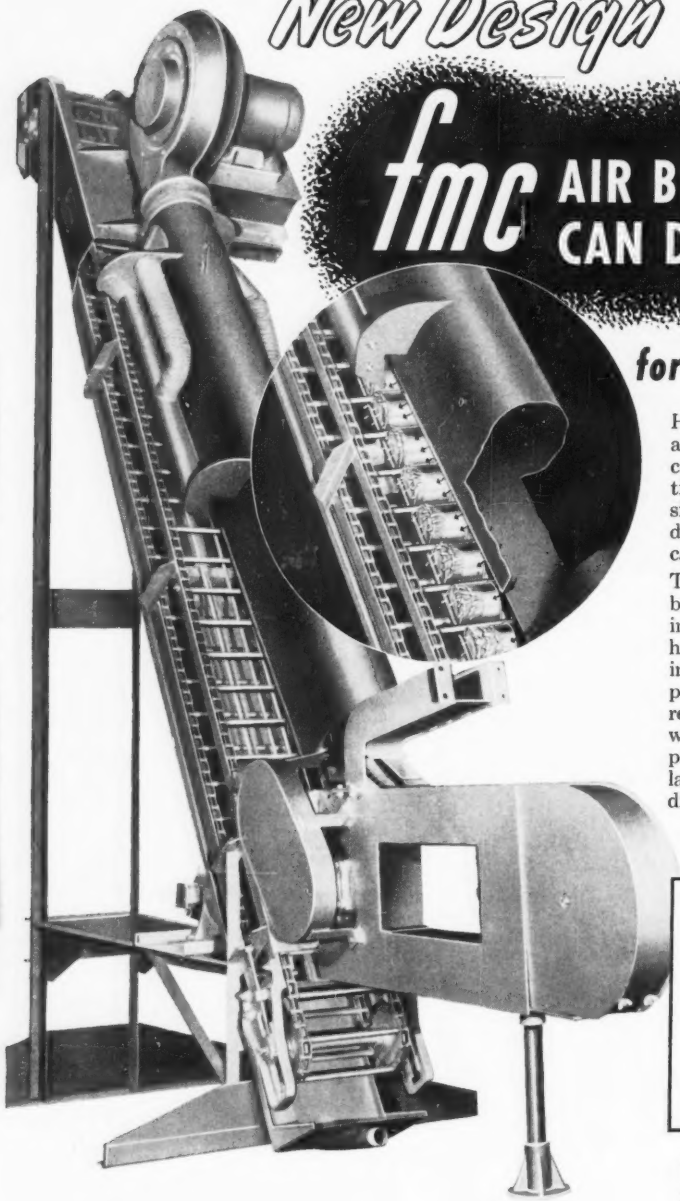
Though only 2½ in. thick, door is reported to have high insulation value. It has a smooth outside surface. Suspension is by hinges attached to steel strips running along one side. Maker states it weighs much less than conventional metal protected swinging doors.—*Stick-Klip Co., Cambridge, Mass.*

Circle 129C on Reader Service Card

New Design

fmc AIR BLAST CAN DRYER

for Greater Efficiency

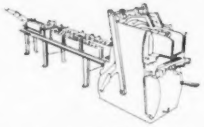


Here's the newest thing in can dryers: a high speed unit that even dries cool cans without re-heating—at capacities up to 450 cpm, depending on can size. A constant flow of high velocity directional air blasts all moisture from can surfaces.

The FMC Air Blast Can Dryer is built for either horizontal or inclined installation in small space, and will handle any can size up to and including No. 10. Available in gravity or positive feed, according to capacity requirements. Because it dries cans which have been cooled to room temperature, the FMC Dryer permits labeling and casing right from the dryer.

OTHER FMC CAN HANDLING EQUIPMENT

FMC MODEL 3 NON-SHOCK CASER



Employing a new and improved design, the FMC Can Caser takes the shocks out of casing. Its high speed one-man operation is fully automatic.

Write for full information or call your nearest FMC representative.

•••• *First in* ••••••

New Chemicals

New Liquid Germicide Cleans and Deodorizes

Reported is a new liquid germicide that not only cleanses, but deodorizes and disinfects at the same time.

The cleaner, known as Korex, is a unique compound combining soap, synthetic detergent, a germicide, a wetting agent, and a penetrant with water softeners and emulsifiers. It is unaffected by hard water, breaks down and cuts through dirt in one application, and destroys the bacteria of communicable diseases.

Highly concentrated, Korex must be diluted up to 40 to 1 with water before using, and is effective and safe on all surfaces unharmed by water, and will not irritate human skin.—*Huntington Laboratories, Inc., Huntington, Ind.*

Circle 131A on Reader Service Card

System Provides Chlorine For Water Treatment

A unique product-equipment combination for chlorinating water has been developed. In the new method, dry chlorine can be accurately metered for applications where a slow, steady release of available chlorine is desired.

Combination is stated to be particularly advantageous for chlorination in small portable water plants, for industrial waste and sewage, for cooling water (where algae control is a problem), for sanitizing bottle washing equipment (as in dairies) and other water-carrying equipment, and for use in canneries.

New agent employed is HTH (high test calcium hypochlorite) in tablet form. Equipment is a specially engineered feeder called a hypochlorinator, designed to dissolve the tablets and dispense the resultant available chlorine solution at rates which can be accurately controlled and quickly varied to cover a wide range of operating demands.

HTH has been used for years to convey chlorine in dry form for various applications, but it has always been necessary to dissolve the granules in water and dispense the prepared solution through a feeding device.

According to maker, new system will eliminate disposal of insoluble sludge and clogging of equipment, storing of bulky, heavy glass bottles of sodium hypochlorite, and all weighing, mixing and handling operations.

Hypochlorinator is reported easily and quickly installed. It presents no health or accident hazards and does not require attention of technical personnel, since it is simple to operate.

Tablets are pure compacted HTH, containing 70 percent available chlorine, with no binder or filler, and possessing good mechanical stability. In size, each tablet is $\frac{3}{4}$ in. dia. and $\frac{1}{4}$ in. thick, with slightly curved faces to facilitate handling. Equivalent to about one teaspoonful of granular HTH, each weighs about 1/6 oz.

In operation, hypochlorinator takes water from the high pressure point of a system, at a rate controlled by a needle valve and indicated by a flow meter, and injects it into a tablet bed. This results in a chlorine solution, which is returned to the system at a low pressure point. Body of unit is transparent plastic, thus operator can tell at a glance when to refill.

Standard model, designed to produce up to 6 lb. of chlorine from a single filling, is 17 in. high and of 8-in. dia. It has no moving parts.—*Mathieson Chemical Corp., Mathieson Bldg., Baltimore 3, Md.*

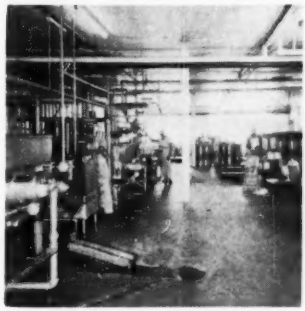
Circle 131B on Reader Service Card

Non-Melting Grease Used in "Hot-Spots"

Newly marketed is a new lubricating grease for use on either plain or anti-friction bearings in all applications in industry where both "cling" and lubricity should be maintained despite high operating temperatures.

Kantmelt, as the name implies, does not melt, states maker, even under the highest temperature conditions where lubrication is required. It is a synthetic grease, containing no metallic soaps, fatty acids, filler, water or alkali. It is termed stable under all conditions of service and storage.—*Specialty Products Co., 190 Warren St., Jersey City 2, N. J.*

Circle 131C on Reader Service Card



Floor Life Extended With Use of Emery

Second only to the diamond in hardness, emery has now been put to work to make floors last longer.

Besides toughness and durability, emery has other characteristics of advantage which include resistance to oils, fats, sugar, organic wastes, most acids, moisture and steam, and intense heat (when mixed with heat-resistant cement). Emery aggregate floors are also able to withstand loads up to 14,500 psi. without noticeable effect, and because of their high tensile strength, of 1,048 psi., resistance to tearing caused by tractive loads is increased.

Another attribute of the flooring is that as more emery particles become exposed, it improves with wear.

Emery aggregate consists of sharply irregular emery particles, which, when mixed with cement and water, form a densely cohesive mass that bonds and dries to extreme hardness. To insure that the proportions remain constant, the aggregate is crushed, graded and packaged in 100-lb. bags at the producer's plant.

It can be used as new flooring or to resurface old floors—forming a $\frac{3}{4}$ in. thick surfacing which bonds to the base concrete. In resurfacing, the area to be covered is scarified and the old surface removed to minimum depth of $\frac{3}{4}$ in. The emery aggregate is then grouted into place.

Machine mixing of the ingredients—one bag of emery to two bags of Portland cement—is recommended, and not more than $3\frac{1}{2}$ gal. of water should be used for each bag of cement. After mix has been spread evenly, it is screeded and the edges well tamped with a heavy roller or by hand until maximum compaction is secured. The surface is then floated with a disc type machine.—*Walter Maguire Co., 60 E. 42nd St., New York 17.*

Circle 131D on Reader Service Card

In Behalf of Progress . . .

Chemicals Controversy Scorches Industry

Food manufacturers and processors have a public relations problem on their hands. It stems from the chemicals-in-foods controversy and its backwash of bad publicity.

Consumer distrust and outright condemnation were revealed by C. W. Crawford, sound-thinking Commissioner of Food & Drugs, at recent meetings of the American Institute of Baking and American Bar Association. The Commissioner's comments are of great importance to the entire food industry.

It seems that a barrage of criticism—surpassing anything seen by Mr. Crawford in his 35 years of public service—came in the wake of the proposed bread standards order in August, 1950. Consumers were alarmed at assertions that these standards would prevent further improvement in bread—characterized by propaganda as inferior.

The Food & Drug Administration answered the complaints. Consumers were told that the standards would prevent the kind of cheating in which claims of supernutritive values were based upon inconsequential amounts of unusual ingredients.

But this good work was undone. A radio commentator characterized the answers as double-talk, and another flood of complaints broke loose.

The letters revealed what many people think about the proposed bread standards, the baking industry and its principal product, and about the food industry as a whole.

Here are a few of the disturbing notions taken from the letters:

1. White flour and sugar are poisonous and ought to be outlawed.

2. Milling removes all the worthwhile nutrients from wheat, and the white flour that goes into bread is virtually worthless in a nutritional sense.

3. The best part of the wheat berry is sold for cattle feed, or it is used to extract the vitamins for sale as dietary supplements which the public needs because of impoverished bread.

4. Millers use harmful chemicals to bleach flour. And bleaching further devitalizes the flour.

5. Bakers use harmful chemicals to fabricate loaves that are a travesty on real bread.

The irony of it all! These attacks are directed mainly at enriched white bread. Yet this product has played a large part in eliminating nutritional deficiency diseases.

Such notions are not justified. But they exist. The question now is what to do about the situation.

Commissioner Crawford has some ideas:

Sound programs of consumer education in nutrition would be helpful—particularly if conducted in an aura of complete scientific freedom.

Bakers who claim completeness of nutritional values for their products should cease making such claims. They discredit the baking industry and ignore the fact that a varied diet is necessary for good nutrition.

Bakers should continue their progress in plant sanitation. Then visiting housewives would see that the plants are cleaner than the average kitchen.

Bakers should sponsor standards for more types of bread to insure that the composition is what it should be and that the names under which breads are sold are accurately meaningful to consumers.

Much attention should be given to the taste quality of bread. A large proportion of complaining consumers say that bread tastes like cotton, paper towels and wallpaper paste.

We fully agree with Commissioner Crawford's suggestions, knowing that he has great respect for the integrity of the food industry and the quality of its products.

We also agree with his contention that the Food, Drug & Cosmetic Act should be modified to plug the gap that invites consumer cynicism. We refer to a change that would give consumers reassurance that no inadequately tested substance will be used in foods.

And there is no doubt of the need for removing the loophole which permits many imitation foods to be marketed in a way that amounts almost to an economic cheat.

Finally, we feel strongly that food, drugs and cosmetics should continue under a single government agency as far as regulatory control is concerned. The contrary recommendation of the Hoover Commission is a mistake in light of the performance record of F&DA.

As we said in September, we believe it is time to get back to common-sense fundamentals in respect to chemicals in foods, food legislation and standards, and food company practices.

And as the past year has demonstrated, it is not enough to serve consumers well. The industry—with the cooperation of F&DA—must instill in the public mind renewed confidence in the integrity of food companies and the quality of their products.

Want Steel? Then Sell Scrap!

Flow of steel scrap to the mills still is inadequate. And use of steel in the defense program is increasing sharply. If you need steel, you help yourself—and the nation—by selling the steel in your obsolete equipment, useless structures, and junk heaps.

MILK

Batch—2,000 gallon tank truck.

Operation—Stirring to insure uniformity before dumping or sampling.

Mixer—LIGHTNIN S-2, ½H.P. portable mixer, direct drive, totally enclosed motor, stainless steel shaft, propellers, tube and chuck.

CATSUP

Batch—300 gallon open tank.

Operation—Stirring while cooking, to prevent burning.

Mixer—LIGHTNIN D-2, ½ H.P. portable mixer, gear drive, with totally enclosed motor, stainless steel shaft and propellers. Stainless steel tube and chuck; bronze housing.

LARD

Batch—1,000 gallon open tank.

Operation—Rendering or blending batches.

Mixer—LIGHTNIN D-3, 1 H.P. portable mixer, gear drive, with totally enclosed motor, stainless steel shaft and propellers.

EXTRACTS *(water base)*

Batch—100 gallon open tank.

Operation—Simple blending.

Mixer—LIGHTNIN C-4, ¼ H.P. portable mixer, direct drive, with semi-enclosed motor, stainless steel shaft and propellers.

Modifications—With alcohol use explosion-proof motor.

MAYONNAISE

Batch—200 gallon closed tank.

Operation—Premixing ingredients before going to colloid mill for high uniformity.

Mixer—LIGHTNIN 33G-50, ½ H.P. nozzle mounted mixer. Gear drive, with totally enclosed motor, stainless steel shaft and propellers.

MILK *(Pasteurizing)*

Batch—100 to 150 gallons—open tank.

Operation—Stirring while heating.

Mixer—LIGHTNIN LDG-25, ¼ H.P. permanently mounted mixer, gear drive, with totally enclosed motor, stainless steel shaft and propellers.

SALT BRINE *(canning)*

Batch—500 gallon open tank.

Operation—Dissolving salt in water.

Mixer—LIGHTNIN S-3, ¾ H.P. portable mixer, direct drive, with totally enclosed motor, monel shaft and propellers. Monel tube and chuck. Bronze housing.

MUSTARD

Batch—600 gallon open tank.

Operation—Mixing vinegar, water and essential spice oils. Dissolving salt in the mix. Keeping mustard seed in uniform suspension while drawing-off to colloid mill.

Mixer—LIGHTNIN D-3 1 H.P. portable mixer, gear drive, with totally enclosed motor. Stainless steel shaft, propellers, tube and chuck.

YOU CAN STANDARDIZE ON Lightnin® Mixers

(MIXCO® Engineered)

BECAUSE THERE'S A *LIGHTNIN* FOR EVERY MIXING JOB!

Shown here are eight of the many reasons why LIGHTNIN is the world's largest-selling line of portable mixers. *No matter what you mix,* there is a LIGHTNIN to do the job faster—better—for less.

LIGHTNIN gives rapid bottom-to-top turnover, plus slow rotation—the famous patented "double mixing action" that mixes faster, more uniformly. Every part of the LIGHTNIN is designed *specifically* for mixing. Notice the smooth, easy-to-clean contours . . . the quick-opening swivel clamp that permits adjustments to any angle . . . wide selection of special motors, propellers, and corrosion-resistant metals.

LIGHTNIN is backed by MIXCO's 25 years of experience in making nothing but fluid mixers. Many LIGHTNINs are in service twenty years and more. And every LIGHTNIN is covered by a money-back performance guarantee!

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- ☐ B-102 Turbine and Paddle Type Mixers
- ☐ DH-50 Laboratory Mixers

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Company .....

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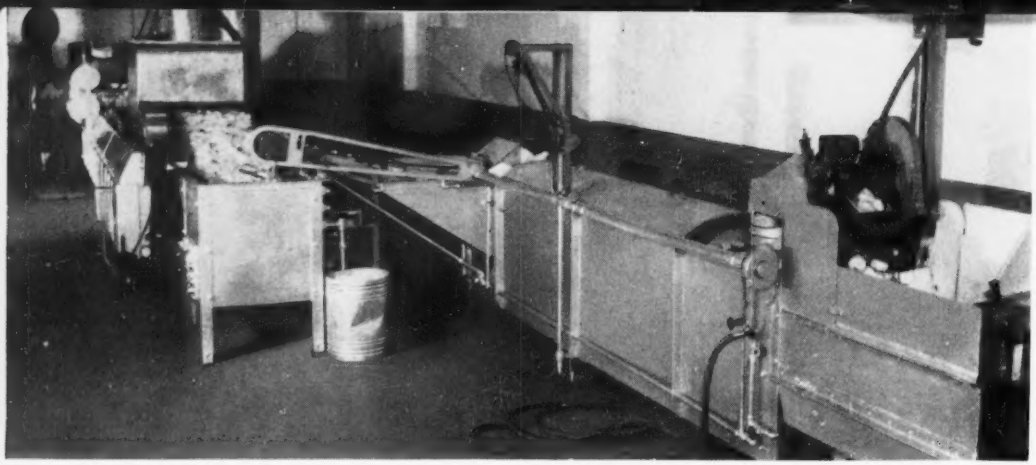
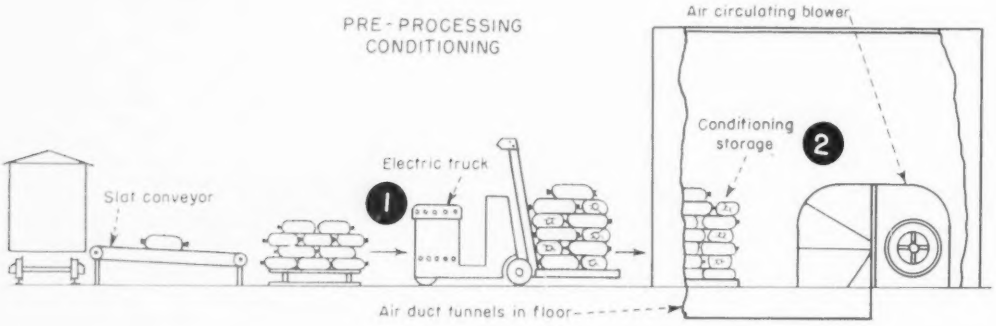
City ..... Zone ..... State .....

TURN PAGE FOR FOLDOUT FLOWSHEET →



MAIN PROCESSING ASSEMBLY. Peeled potatoes enter washer (right), are elevated to slicer which discharges into rotary washer where free starch is removed. Final washer (left) empties into continuous chip fryer (rear).



Making Quality Potato Chips

Product Is Controlled From Spud to Package in Mechanized Process

MASS PRODUCTION of A-1 quality potato chips is notably exemplified in the advanced operation of Red Dot Foods, Inc., Madison, Wis.

Delivered in reefer cars or trucks, either from company-owned farms or warehouses, potatoes bagged in 100-lb. lots enter the plant via slat conveyors. Then, stacked 32 sacks to the pallet, they are transported by electric truck—see Point (1) in diagram—to storage.

Here, the tubers are conditioned prior to processing—i.e., sugars are reduced and there is rejuvenation through changes in chemical composition. Time, temperature and humidity control this phase. Through tunnels under the floor, air is circulated, by 25-hp. blower, to all parts of the warehouse where air movement is required.

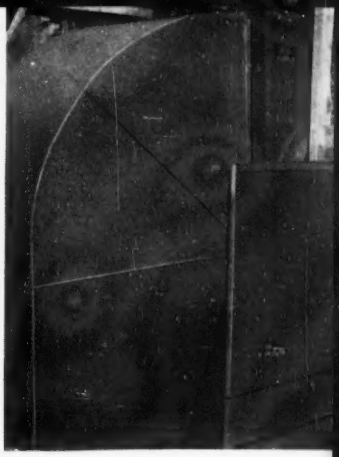
When conditioning is completed, tubers are trucked to the start of the production line and there emptied into a pit from which they are elevated to a peeler-washer.

Peeled spuds are inspected enroute to intermediate collection stations that feed soaker-washers. Elevators lift washed potatoes to a rotary-type cutting unit—Point (4)—which discharges slices into a squirrel cage washer that removes surface starch and potato slivers. There follows draining on a wire mesh conveyor. Then, after a treatment with a sodium bisulfite solution to reduce sugars or amino acids, the chips in the making are carried through a final spray wash, where remaining surface starch is

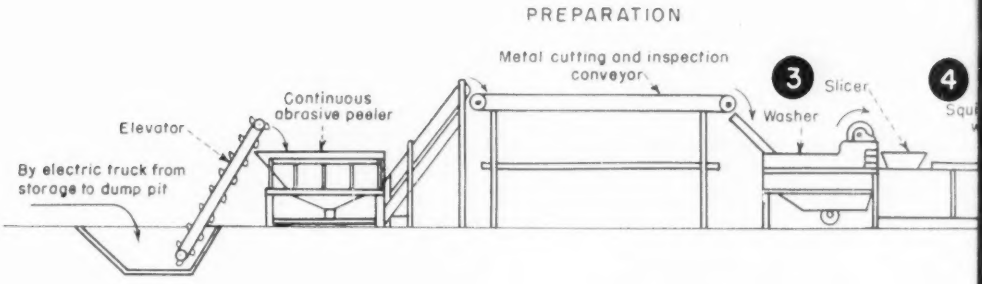
Behind This Advanced Line

—is Red Dot's thoroughly planned program achieving start-to-finish control. You'll find the revealing story in this month's special article, "They Engineered Farm-to-Family Quality." Just turn to page 94.

1 **FORK TRUCK** handles in-plant transportation of potatoes in bags, from railroad cars to storage, then to production lines. Pallet load is 3,200 lb.



2 **BLOWER,** driven by 25-hp. motor, cir
under floor of warehouse to "conditi



FE PICTURE-FLOWSHEET NO. 36

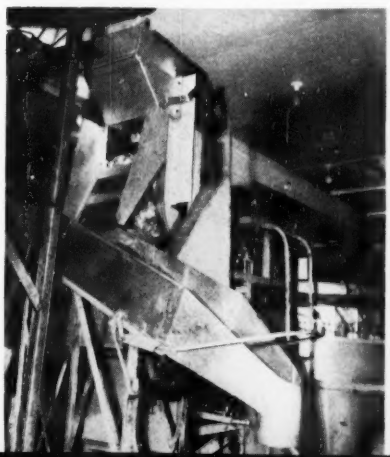
removed before the slices are dropped into the hot oil in the fryer.

Heat supplied to the fryer is constant, the temperature being regulated by the flow of slices into the oil. Chips are continuously removed from the fryer and drained of oil on a mesh belt. Enroute to inspection belts, chips are automatically and uniformly salted.

After chips have cooled during a 64-ft. conveyor travel, they are delivered to a versatile company-built 32-spout volumetric filling machine—Point (7)—which proportion chips into bags (or shoe-string potatoes into cans). Bags of chips travel from the filler by a conveyor, which holds the bags upright to feed into a continuous heat-sealing machine—Point (10).

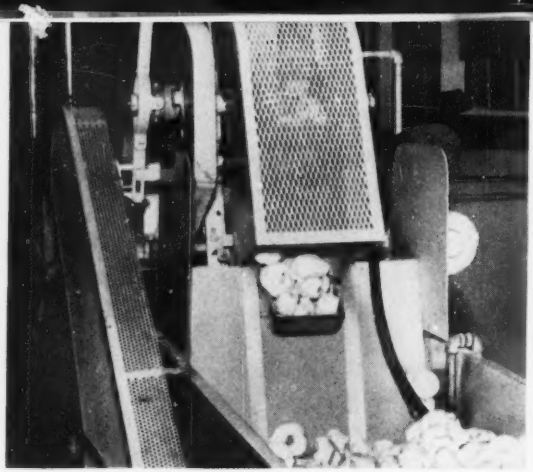
Finally, an electronic mechanism codes and counts packages. Packaging speed of each continuous filling line is 120 bags per min.

6 **BULK FILLER** is fed by automatic overflow from consumer-package filling unit.

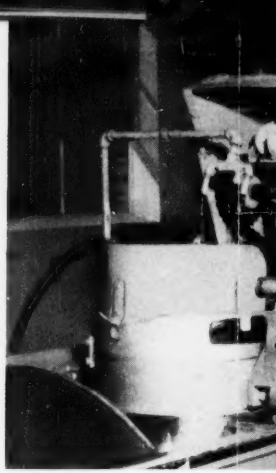


7 **FILLIN**
net wei

otor, circulates air through tunnels "condition" potatoes for frying.

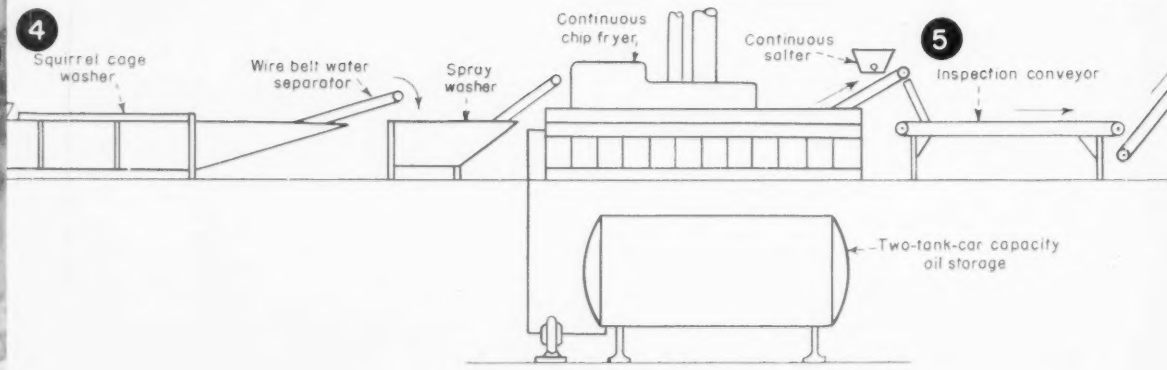


3 POTATOES, after passing through abrasive peeler and washer, are lifted to the slicer by bucket elevator.



4 SLICER delivers chips of unifo by machine adjustment). Slic

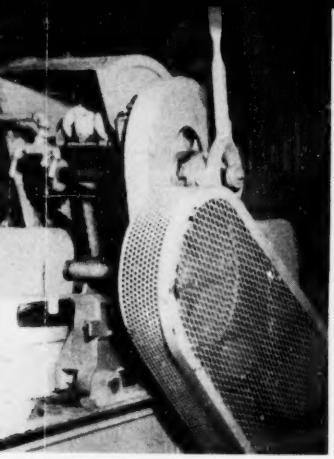
FRYING AND SALTING



FILLING MACHINE has 32 volumetric heads, provides accurate net weight in packages. Rate: 120 per min.

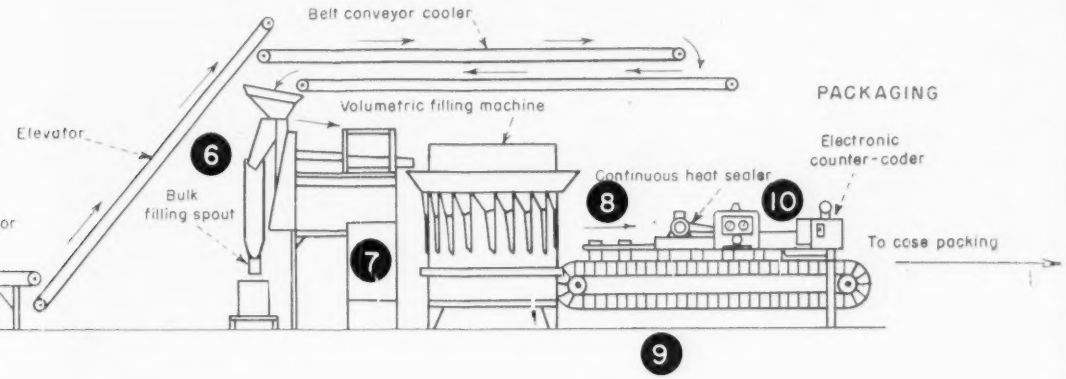
8 OPERATOR slips bags over closed prongs, then trips lever which springs prongs apart to hold bags in place.

9 CONV bags



ps of uniform thickness (cut can be varied ent). Slices go to rotary washer.

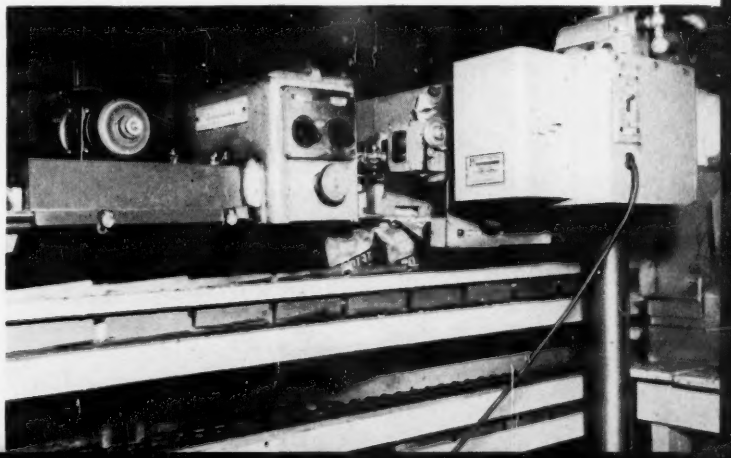
5 CHIPS from continuous fryer (rear) pass along inspection belt enroute to series of belt-conveyor coolers. Volume of chips regulates fryer temperature.



CONTINUOUS POTATO CHIP PROCESS

9 CONVEYOR of special design holds bags upright until they're closed.

10 BAGS of chips are mechanically fed at [illegible] per min. through heat sealer, then go to electronic device that counts packages and perforates code in seal.



Some use Christmas bells...

Some use Christmas holly...

Some use a fat Santa Claus,
Round, red, and jolly...

But <u>our</u> wish takes all of them,
See? They're all here –
To say...

MERRY CHRISTMAS!

And a **BRIGHT GOOD** next year!

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on Heavy-Duty Steam Drying Units

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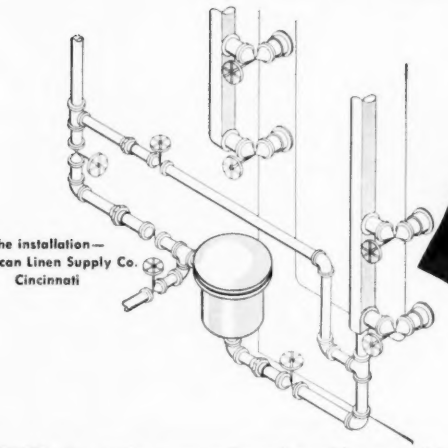
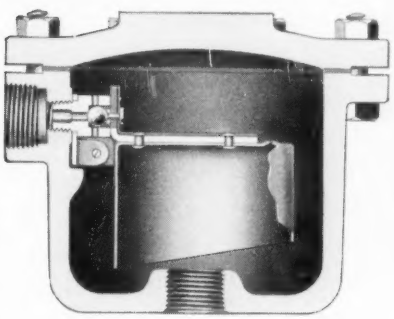


he installation—
can Linen Supply Co.
Cincinnati

Rely on Dependable CRANE STEAM TRAPS



Crane Inverted Open Float Steam Trap with patented ball-type disc, for 1 to 300 pounds saturated steam working pressures. Literature on request from your Crane Branch or Crane Wholesaler.

BLEM: To equip a steam-heated tumbler-type drier with a trap that would reduce start-up time to a minimum, and provide, automatically, a smooth, steady flow of hot, dry steam to the unit, with the lowest possible maintenance cost.

RKING CONDITIONS: Steam pressure to drier, 125 pounds. Drier operated 16 hours daily on continuous batch basis.

UTION TO PROBLEM: Crane No. 981, ¾-inch, 150-Pound Inverted Open Float Trap, carefully selected for adequate drainage capacity, and properly installed. (Now listed as No. 9810, with patented improved ball-type disc.)

ULTS: Never requiring any repairs or new parts in more than 8 years' service, this Crane trap has given complete satisfaction. Periodic routine inspection only is total maintenance cost.

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See for yourself how *Mosaic Tile* will enhance the appearance of your plant; increase its sanitation; improve employee morale, and reduce costly overhead. Consult your architect, builder, tile contractor—or write Dept. 25-6 The Mosaic Tile Company, Zanesville, Ohio, for detailed information. Of course, there's no obligation!

Long-wearing, low-maintenance Mosaic Carlyle Quarry Tile floor and Mosaic Tile wall—Missouri Pacific Hospital Kitchen, St. Louis, Missouri. Specifications: Wall—Mosaic Tile, Color, L-216; Floor—Mosaic Carlyle Quarry Tile, Oriental.

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Our Defense Program Faces a Crisis

A major crisis will soon confront our defense program.

It is not a crisis in raw materials. To find enough materials, from steel to cobalt, for defense production is a serious problem. But it is one that is being solved.

It is not a crisis in manpower. Shortages of workers with special skills hamper production, but these shortages are being relieved, slowly.

It is not a crisis in manufacturing capacity. American industry's record-breaking expansion is, with very few exceptions, keeping abreast of defense needs.

The coming crisis will be one of finance. It will rise from our failure to provide the means to PAY FOR the defense program we now have under way.

A $15 Billion Deficit?

Congress has approved a defense program which is scheduled to raise *total* federal spending in the year from June, 1952, to June, 1953, to somewhere between $85 and $90 billion. Additional appropriations for more air power and atomic development, which are now proposed, would add several billion dollars.

But Congress has not approved a tax plan to match such spending. With the new levies enacted in this session, tax collections during the 1952-53 fiscal year are estimated to fall somewhere between $70 and $75 billion. That would be roughly $15 billion short of balancing the budget. If the defense program is expanded, the deficit will be that much greater.

We have not yet felt the impact of the crisis that would accompany a federal deficit of this magnitude. Federal tax collections currently are big enough to balance federal expenditures. But the defense program is scheduled to boost the annual rate of federal expenditures $25 billion in the next year.

To Meet the Crisis

By January the crisis will be clearly in sight.

Then the President will present his budget. After that, Congress must act to close the broad gap between government income and government spending. If it fails to do that, the whole defense program will be menaced by weakness in its financial foundations. That weakness might well take the form of another destructive wave of inflation.

We have three ways to meet this crisis.

The best approach, of course, is to cut unessential expenditures. That can make a real dent in the deficit. The second is to collect more

taxes. The third, and by all odds the most dangerous, is to have the federal government meet its deficit by going deeper into debt. Borrowing, which might feed inflation, can easily lead to disaster.

Near Income Tax Limits

It will not be possible to raise taxes to meet the deficit merely by increasing further the rates on corporations and on persons in the upper income brackets. Congress has about scraped the bottom of that barrel.

The Senate Finance Committee said as much in reporting this year's tax bill. The Committee reported that it had "serious doubts as to the feasibility of raising any substantial additional amounts of revenue from income tax sources." The Committee observed that recent tax legislation brings the burdens of most corporate and individual income taxpayers close to the World War II peaks, and actually carries the rates paid by many taxpayers above those peaks.

Our ramshackle federal tax system must be thoroughly overhauled in order to broaden the tax base if it is to produce more revenue—without doing much more harm than good.

The shocking fact is that no one seems ready to act along any line that might enable us to surmount the crisis.

That fact of itself aggravates the coming crisis. And next year's presidential election doesn't make it any easier to move effectively. Both parties will shrink even more than normally from backing any program that might irritate any considerable number of voters.

If we are to meet this crisis on the tax front in an orderly way, the technical work should be in progress right now. To a large extent it is being ignored.

If we are to enforce the vitally essential program of government economy, there is the same urgent need to get under way the spade work that is required.

And if—as a last miserable expedient—we decide to let the federal government drift deeper into debt, it must have a well-developed program of borrowing from individuals and other investors, such as insurance companies, rather than from the commercial banks. Borrowing from commercial banks might speedily translate the deficit into more and more price inflation. No adequate program of borrowing from savings is now in sight.

Now Is the Time

It is possible, of course, that international relations may improve sufficiently to make it safe for us to slow down the rearmament program. If that should happen, the fiscal crisis would not be so critical. But that kind of good fortune has been notably absent in recent years.

Lenin, patron saint of Communism, is quoted to the effect that to destroy a political and social system such as ours "you must debauch its money."

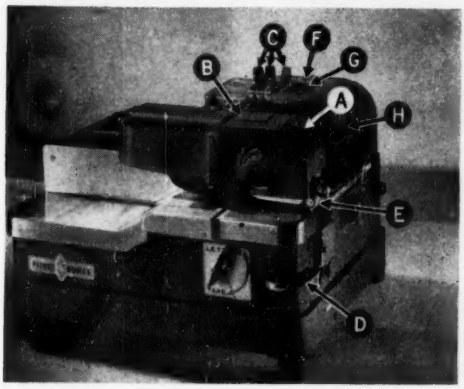
We shall set democracy to digging its own grave if, through our preoccupation with politics during the presidential campaign, we pave the way for further debauchery of our money.

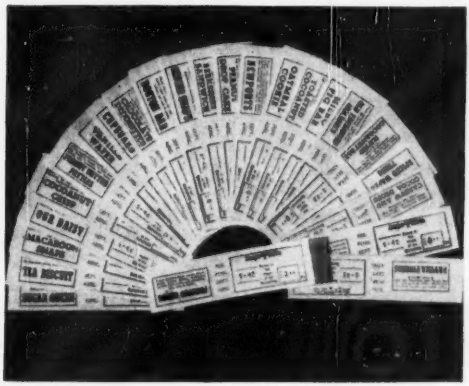
If we really want to avert that disaster, now is the time for us to get going.

Once the crisis is full upon us, it will be too late.

McGraw-Hill Publishing Company, Inc.

SWITCHED: From postal chores . . . **. . . to making product labels**





CONVERTED mail unit and samples of its fine work. Lettering indicates features of machine (explained in text).

Rigs Postage-Meter as *Labeler* And Cuts Costs

Converted unit solves cookie maker's problems by printing weight, date, and ingredient labels. Serves as bookkeeper, too. And reduces line labor

IVAN C. MILLER
Assistant Editor, "Food Engineering"

Long and vigilant—but fruitless—had been the search by Clark Biscuit Co., North Adams, Mass., for the right kind of packaging line machine to code its cases of bulk-packed cookies. Apparently, there was no unit on the market for solving the company's specific problems.

Then one day there came a call from a man who hoped to sell Clark on the advantages of a postage-meter device for stamping and sealing mail.

The biscuit company was interested—very much so. Here was a versatile machine which stamped letters, also dated them, added a meter number, and kept records. *Maybe it could be adapted to meet those exacting labeling needs.*

Maker of the postage meters, Pitney-Bowes, Inc., of Stamford, Conn., agreed that such possibilities were bright. Accordingly, one of the electrically operated metered-mailing units was converted to label printing and put on test. And it worked.

Today, this machine is precisely labeling the biscuit company's cases to show net weight, date (encoded), product identity, and the ingredients. More than that—

- **Labeling has been speeded,**
- **Labeling labor has been reduced by one operator per line, and**
- **Bookkeeping has been simplified.**

Assignment of the mail-meter was on the two lines where cookies are not only packed in bulk (14-15 lb. per box), but often by count. In short, net weight may vary from case to case—an indication of the special demands on the machine.

Used to Be Tedious Hand Job

Formerly, net contents was marked on the boxes by hand stamping. At the weighing station, a rack was provided for a big battery of rubber stamps, each one marked for a different weight, in ¼-lb. increments.

Information on type of product and ingredients, and the coded date were also hand stamped on each box.

Then the cartons were closed and stacked on skids, with the number of cases and total weight recorded by an operator. Weighing, stamping, skid-stacking, and record keeping required three operators per line.

Recording the number and total weight of cases on each skid was not only a laborious task, but one subject to mistakes. As for individual boxes, although there was small risk of error in dating, blunders in stamping weights did occur.

Such "boners" were ruled out by the new system. Now the operation goes like this:

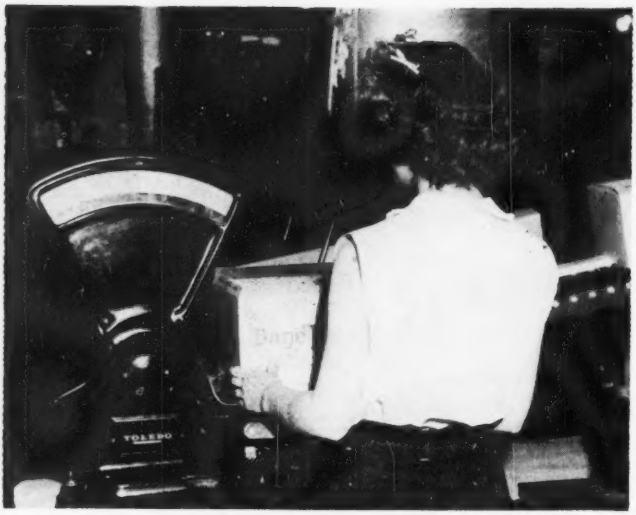
Improved Labeling Method

Filled cases arriving by conveyor are transferred by an operator to the scale and weighed. The same worker then sets weight levers on the converted mail-meter, which records in pounds and quarter pounds. Levers indicating pounds need only to be changed when shifting from one cookie pack to another.

Next, the operator taps the tape control, and from the machine there issues a moistened strip of gummed paper bearing brand name of product, net weight, date packaged, list of ingredients, and even a trade slogan (see photo of labels).

Operator now attaches the label to a flap that folds under the top-edge cover of the carton. A duplicate label goes on the outside front of the carton, thus should one become detached, there is still the other as a record.

Operator In Action →



First, she weighs box

The cartons now go to a table where a second operator loads skids and also keeps records in accordance with order requirements.

How Machine Operates

The novel labeler is constructed in two parts. Operating mechanism is in the base, to which a removable metering machine is attached. To start a day's run, the fixed printing that is to appear on the labels for each batch is first changed.

Referring to the photo of the machine, this is done by opening the door at (B) for access to the cylinder for changing the date. Next the door (A) is opened to change the plate that prints product identification and ingredients.

Shifting of the three adjustable levers (C) on the meter top determines the weight-print—the only variable once the machine is set for a run. To insure against errors, the setting of these levers can be checked on a dial immediately below them. Weight range on Clark's meter is ¼ to 99¾ lb.

Totals Accounted

After the levers are set to the scale-weight of the carton, control (D) is depressed. This delivers the printed label at (E). Each press of the control lever adds a unit to the recorder (F), which totals the number of labels printed. Recording dials at (G) and (H) register weight totals. On the former, weight is accumulative; on the latter it is subtracted from the initial setting of 99,999 lb.

To return to the operation: After each skid is loaded, the second operator notes on a production form, the number of cases and total weight, both figures being taken from the dial readings. On the completion of a batch, and at the end of the day, totals are also taken. It may be noted that the biscuit company divides its totals by two, since, as stated earlier, duplicate strips are employed for every carton.

Cost Figures

Operating base of the unit and the plates (similar to those used for postmark advertising via the postage meter) were bought by Clark for approximately $1,000, while it leases the metering section from the maker (as is the practice on meters for commercial mail-metering purposes). Leasing runs about $33 per quarter-year.

The biscuit company amortized its original investment in less than a year, and on each line there is one less worker, meaning a labor cost saving in a few weeks that covers the full annual lease expense. And in addition, the meter device has proved less costly than the old print-shop operation on the score of paper, ink, and labor.

Then takes label from machine

Sticks it on

Other Food Plant Uses

Application of the postage-meter in the food field is not limited to bulk-package labeling. Machines are used for product or wrapper counting, coding and dating consumer packages, and counting and canceling premium coupons returned for redemption.

Use of meters can range over a wide variety of products, including processed meats, bottled beverages, bakery and confectionery products, flour and cereals, cheese, margarine and prepacked vegetables.

. . . And job's done

Lab Tests Show Possibilities Of Open Pressure-Cooker

Food engineers demonstrate that hydrostatic principle can be adopted in open tube to permit continuous water cooking of canned goods . . . U-shaped unit proposed.

LLOYD L. KEMPE

Department of Food Technology,
University of Illinois, Urbana, Ill.

Research work at the University of Illinois has indicated that continuous thermal processing of canned foods is feasible in an open U-shaped tube. Basic in the technic is the hydrostatic principle.

Here is the story of the development:

It was noted that since the boiling point of fluids varies directly with the pressure, foods can be water-processed in a closed retort at temperatures above 212 deg. F. At such temperatures, glass or tin containers develop internal pressures above that of the retort. These pressures are counter-balanced with compressed air, but the procedure requires special equipment.

On the other hand, hydrostatic pressure in an open vessel could theoretically raise the temperature at which processing water remains liquid and simultaneously counterbalance excess internal can pressures.

Proctor[1] recently described a continuous steam sterilizer for bottled milk. His apparatus involves an endless chain carrier that communicates between the outside atmosphere and an interior steam chamber through water seals. This principle is also used in one type of continuous vegetable sealder.

Since the temperature at which these steam processing devices operate is established by the depth of the water seals, neutralization of excess container pressures would appear to be a problem similar to that in other closed retorts. Speculative considerations suggested that an open pipe hydrostatic cooker should permit continuous water processing of canned foods at elevated temperatures and, at the same time, provide for the counterbalancing of excess internal can pressures.

With the above in mind, preliminary work was undertaken to test the feasibility of water-processing canned foods in an open hydrostatic cooker.

The apparatus (see sketch) used for the preliminary work reported in this paper consisted of a 3-in. wrought iron pipe 30 ft. high having a drain hole located 3 ft. from the top and closed at the bottom with a pipe coupling and plug. A Fahrenheit thermometer was threaded into the pipe 9 in. above the bottom, and a ¼-in. pipe was similarly fastened into the coupling, as shown. The small pipe was used to introduce either water or steam as required.

First, a tripod type maximum thermometer was placed in a 202 x 314 tin can, which was then filled with apple sauce or tomato catsup to within ½ in. of the top. Next the cover, which had a pinhole in the center, was soldered in place. The can and its contents were then heated to about 200 deg. F. by partial immersion in boiling water. Final closure was carried out by filling the pinhole with solder.

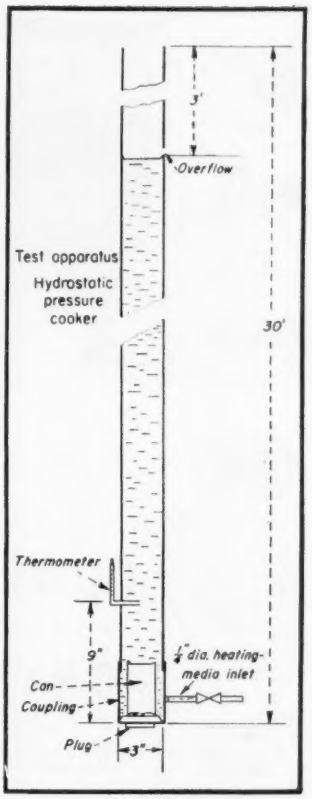
At this point, the coupling in the base of the pipe was removed and the tin can inserted in the pipe. The coupling was then replaced and water introduced until it overflowed at the drain hole. This established an open 27-ft. column of water in the hydrostatic pipe cooker and completed preparation for a thermal processing run.

Heating was accomplished by bleeding 15 psig. steam directly into the base of the water column through the ¼-in. pipe. Since a 27-ft. head of water existed in the pipe, any temperature below about 242 deg. F. could theoretically be used for cooking. The desired temperature was maintained by manually adjusting the steam volume. Following completion of the cook, cold water was introduced through the ¼-in. pipe to cool the can while it remained under hydrostatic pressure.

Finally, the pipe was drained and the can removed for examination.

Apple Sauce and Catsup Tested

Two runs were made using the above procedure. In the first, the water temperature at the base of the column



was maintained at 230 deg. F. ± 1 deg. F. for 15 min. After this, the water was cooled to 208 deg. F. and then immediately reheated to 237 deg. F. before cold water was introduced to cool the can. The latter part of the run required 20 min. When the can was removed, the maximum thermometer showed that a temperature of 225 deg. F. had been reached in the center of the apple sauce.

Tomato catsup was used in the second run. The temperature of the heating water was maintained at 233 deg. F. ± 1 deg. F. for 46 min. This developed a maximum temperature of 233 deg. F. at the center of the can.

It is common knowledge that liquids can be used as heating media at temperatures above their atmospheric boiling point. The typical retort installation for processing foods in glass containers represents one instance of this procedure. It is not so generally recognized that the hydrostatic pressure in an open vessel is equally effective for raising the temperature at which water boils.

However, in order to make use of this principle, it is necessary to restrict

(*Turn to page* 155)

Jeffrey-Traylor Direct-type DRYER—furnished with either perforated or louvered conveying surface through which drying or cooling air or gases are passed. As solid material is conveyed over surface, each particle is continuously and completely surrounded with a stream of air or gas of correct temperature and condition.

COOLING OR DRYING

CUSTOM-BUILT SYSTEMS *Engineered to meet your need*

It looks BIG . . is BIG . . does a BIG job. It's the Jeffrey-Traylor Dryer for granular materials. Made in standard-unit lengths, each independently powered. Sections can be arranged in exactly right combination for any operation—and they work together. Conveying action by electric vibration. No contamination of material—no breakage—no loss of color or luster. Specially valuable for processing under closely-controlled conditions. Can be used for cooling as well as drying. Catalog No. 804 tells all. Send for it.

THE JEFFREY MANUFACTURING COMPANY

ESTABLISHED 1877

927 North Fourth St., Columbus 16, Ohio

Complete Line of Material Handling, Processing and Mining Equipment

Baltimore 2 Boston 16 Cincinnati 2 Detroit 13 Houston 2 New York 7 St. Louis 1
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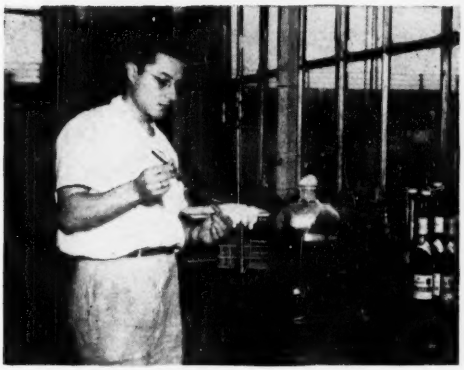
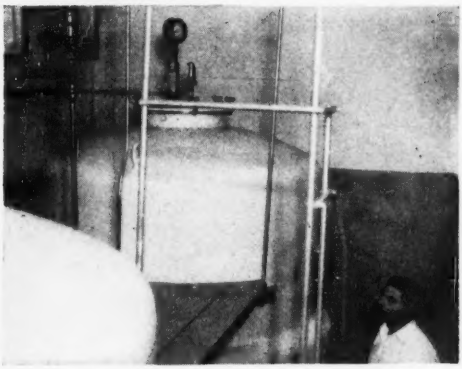
Steps In Advanced Wine Operation

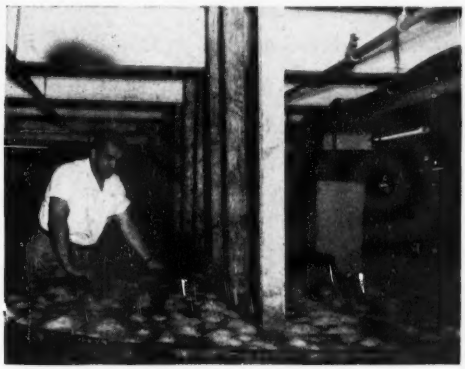


USING sterile platinum needle, bacteriologist transfers yeast strain from agar slant into sterile juice in bottle.



JUICE (400 gal.) is steam-sterilized in glass-lined tank (background) and fed to propagator (foreground).

AFTER flaming spigot, technician connects sterile tube to bottle and pure yeast culture is sucked into propagator.



FOLLOWING addition of 8 percent of yeast culture into juice in vat, fermentation proceeds at a rapid rate.

UNIFORM QUALITY WINES

Made by Using Bulk-Propagated Yeast Cultures

Garrett winery installs improved juice-sterilizing and yeast-culturing system that reduces contamination to a practical minimum. Pure strains innoculated into juice in fermenters produce consistently better products

R. S. FELLERS
Chief Chemist, Garrett & Co., Inc.,
Brooklyn, N. Y.

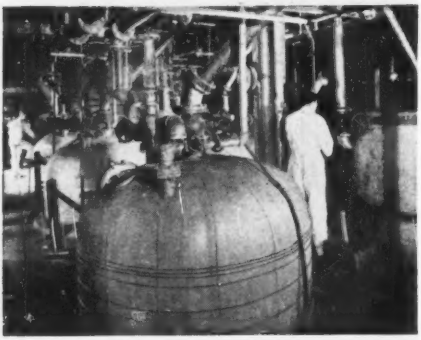
Production of wines that are uniform in quality requires, of course, that a pure yeast culture be used for fermenting juice or must.

Through the use of pure yeast cultures, fermentation is more accurately controlled, time and labor required for racking and aging are reduced, and a cleaner taste and flavor are produced.

Recognizing the imperfections in our former method of propagating pure yeast cultures at Garrett & Co., we began investigating the technics employed by other industries. Borrowing ideas from the brewing industry, we then installed a dual juice-sterilizing and yeast-propagating system in our plant.

Briefly, our new system comprises a 632-gal. glass-lined Pfaudler tank for sterilizing juice and a similar 626-gal. unit for propagating pure yeast cultures. Sterilization and yeast-propagation are under a closed system.

Air view of the Corn Processing Division, Clinton, Iowa. Many OIC Valves are working through this plant.



At CLINTON FOODS Inc.

Makers of Fine Corn Products

For many years, OIC Valves have been going into this food processing plant, as Clinton Foods Inc. expanded some operations, modernized others—keeping all at the peak of production. The Ohio Injector Company is proud to have shared in this program.

Because OIC Valves are *precision engineered* and *precision built,* you can specify OIC Valves and be assured of efficient, precise control. The Ohio Injector Company, Wadsworth, Ohio.

OIC
FOUNDED 1883

VALVES

FORGED AND CAST STEEL · IRON · BRONZE

Other than the primary improvement in product uniformity and quality, we have won these key advantages—

- **Reduction in the amount of time and labor required to prepare pure yeast cultures**
- **Triple increase in the amount of yeast cultivated**
- **Reduction to a minimum of contamination of yeast cultures**

But let us start from the beginning in recounting the story:

In the old method, pure yeast strains were aseptically transferred from an agar-culture slant into a gallon jug containing sterile juice. Next, the juice was fermented for 72 hr. in a 78-deg. F. incubator. And from this point on, aseptic precautions were not taken in culturing the yeast.

Our bacteriologist then innoculated the gallon of yeast culture into a 5-gal. carboy containing about 3½ gal. of non-sterile juice. Fermentation next proceeded for about 48 hr. at room temperature. Then the fermenting-room foreman added the carboy of culture into a 50-gal. barrel of non-sterile juice. After 48 hr. of fermentation, approximately 4 percent of the culture was introduced into fermenting vats holding about 1,600 gal. of juice.

New Culturing Technic

Now for point-by-point details of propagating yeast the present way: Grape juice (22 deg. Brix) is prepared in a mixing vat and pumped into the steam-jacketed sterilizing tank. Here, the juice is raised to 212 deg. F. and then sterilized for 10 min. at 220 deg. F. to destroy the more resistant wild-yeast spores. Sterilization of the juice takes about 1¾ hr.

Next step is cooling the sterilized juice. The steam valve is turned off and cold water is circulated through the steam jacket until the temperature of the juice reaches about 80 deg. F.

During the sterilizing and cooling process, filtered compressed air (20 lb. of pressure) is emitted into the tank to circulate the juice and prevent scorching. Air is filtered through a 3-in.-dia., 12-in. long stainless steel tube packed with sterile cotton.

The sterilizing tank is equipped with a juice thermometer, two pressure gages (for indicating internal pressure of the tank and steam jacket), two safety or popoff valves (for tank and jacket), and a liquid-level gauge for measuring the volume of the juice.

Bulk Yeast Culturing

Propagation of the pure yeast strains follows: Among the many strains employed, the principal ones used in our winery are:

Iona—a vigorous-growing, all-purpose strain that evolves heat during fermentation at a fairly level rate.

Champagne—a high bouquet-yielding yeast employed in the manufacture of such dry white wines as Chablis, Sauterne, Rhine, Reisling, Moselle, and Champagne.

Burgundy—a heavy body-producing strain used to make such dry red wines as Zinfandel, Burgundy, and Barbera.

Sterilizing the propagating tank is the first step in culturing the yeast. Steam is emitted into this tank through a ¾-in. stainless steel pipe until the pressure reaches 8-10 lb. Sterilization takes place during the 15 min. this pressure is maintained.

In sterilizing the propagating tank, the gas outlet line is left open until the entering steam has driven out the air as shown by live steam appearing at the outlet. Then the system is closed and the steam pressure built up to 8-10 psi.

And now, with the tank sterilized, it is cooled by alternately introducing filtered compressed air (20 lb.) and then releasing it through a valve. As the compressed air expands, it rapidly absorbs heat. A slight pressure is maintained to minimize possible contamination due to suction of outside air into the tank.

After the internal temperature of the tank drops to about 130 deg. F., the safety valve is opened to release the pressure. Then, as the propagating tank cools, a small amount of vacuum is created for introducing the pure yeast culture through a spigot.

Meanwhile, a pure yeast culture is prepared in the laboratory. Cultured on a nutrient-agar slant, the pure yeast strain is aseptically transferred into a 3-liter aspirator bottle containing sterile grape juice. After the innoculated juice is incubated for 3 days at 78 deg. F., it is carefully introduced into the propagating tank. Virulence of the yeast culture is indicated by the amount of turbidity, foaming, and yeast sediment.

Now the pure yeast culture is fed into the propagating tank. First, the spigot is sterilized by the flame of an alcohol lamp. Next, a sterile rubber connecting hose is hooked up to the aspirator bottle and the spigot. Then the spigot valve is opened and vacuum sucks the yeast culture into the propagating tank.

Feeding the sterile juice into the propagating tank comes next. Approximately 10 lb. of air pressure is built up in the sterilizing tank to force the juice through a 2-in. stainless steel pipe (previously steam-sterilized) into the propagating tank. Air pressure is maintained in the system until the liquid-level gage on the propagating tank registers 400 gal.

Now the actual propagation of the yeast starts. It takes about 72 hr. to obtain a vigorous yeast culture, ready for innoculation into 1,750-gal. culture vats on the floor below. During fermentation, CO_2-gas escapes through a ¾-in. pipe into a watèr-trap below the liquid level of the tank.

At this point, the yeast culture is ready for innoculating juice in the larger culture vats. The yeast culture is gravity-fed through a rubber-discharge hose into the vat, and it comprises about 25 percent of the juice or must. Although the innoculated juice or must is not sterile, the heavy concentration of pure yeast culture suppresses the growth of any undesirable microorganisms. This large culture batch is in turn used to start the final fermentation and varies from 5-10 percent of the final fermented must.

All but 50 gal. of the yeast culture is used for innoculating the juice in the fermenters. The remaining 50-gal. culture is employed to start a new 350-gal. batch of sterile juice. Propagation of yeast in the new batch of juice takes less time than the original one—24 to 48 hr.

This cycle, which can be repeated about 15 times, is limited by:

1. Desirability of switching from one yeast strain to another.
2. Possible contamination, indicated by chemical and bacteriological checks.
3. Plugging of pipe lines in the propagating tank by yeast, tartrates, or other sediment.

—End—

Short Cuts in Hiring

—Continued from page 70

are a panacea for all problems of selection, but they represent a great advance over the old type "interview guesswork." *The utilization of tests will reveal information about employees which would never be known to employers or discovered by them until after a long and costly experience.*

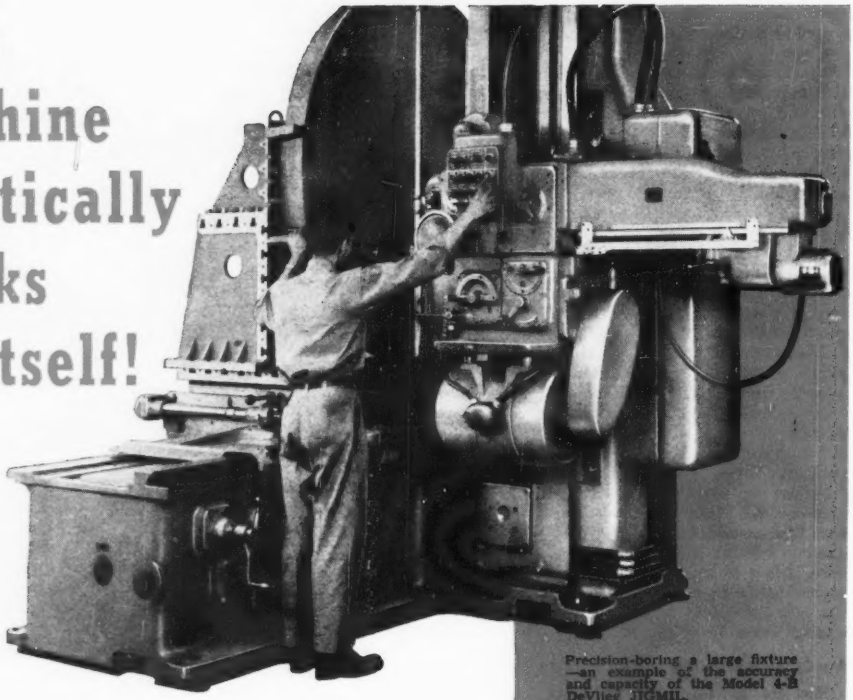
The value obtained by testing is not, by any means, limited to employee selection, but becomes invaluable for determining promotions and the selection of key personnel. Often, advancement has been futiley based on wishful thinking or favoritism, and in the meantime the expenses of indoctrination and training have been incurred.

Engineering departments do not change to new materials or equipment without first being reasonably sure that they will stand up under the stresses and strains to which they will be subjected. This precise approach is in sharp contrast to some of our out-dated personnel policies.

The technics of developing tests and tailoring them to fit job requirements are now going forward rapidly.

End (*Resume reading on page* 71)

This machine practically thinks for itself!



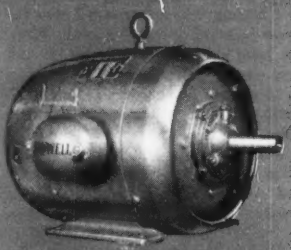
Precision-boring a large fixture —an example of the accuracy and capacity of the Model 4-B DeVlieg JIGMIL.

It's uncanny the way this DeVlieg JIGMIL handles the most complex boring and milling operations *automatically*, simply by pushing a button on the control panel.

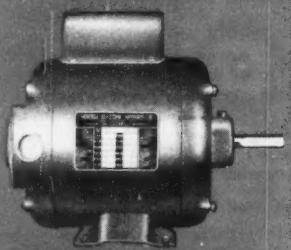
For example — by simple push button control, the workpiece is positioned both horizontally and vertically, and holes are automatically spaced and bored to exact tolerances. A unique index table allows machining of parts from four sides without rechucking. A power tool lock permits locking or releasing cutting tools in a few seconds.

Howell engineers worked closely with this manufacturer to make sure each of the five Howell motors fitted its job exactly. The three 2-speed and two single-speed Howell motors make a vital contribution to the remarkable efficiency of this machine.

Howell will supply the same high degree of engineering skill and experience to your problems. You are assured of quality motors designed for your specific requirements, built to stand up under the heaviest production loads. May we handle your electric motor needs?



HOWELL Type K Motor. Totally enclosed, fan-cooled. Sealed against dust, dirt, fumes and moisture. Sizes from 3 to 150 H.P. at 1800 RPM. For horizontal or vertical mounting.



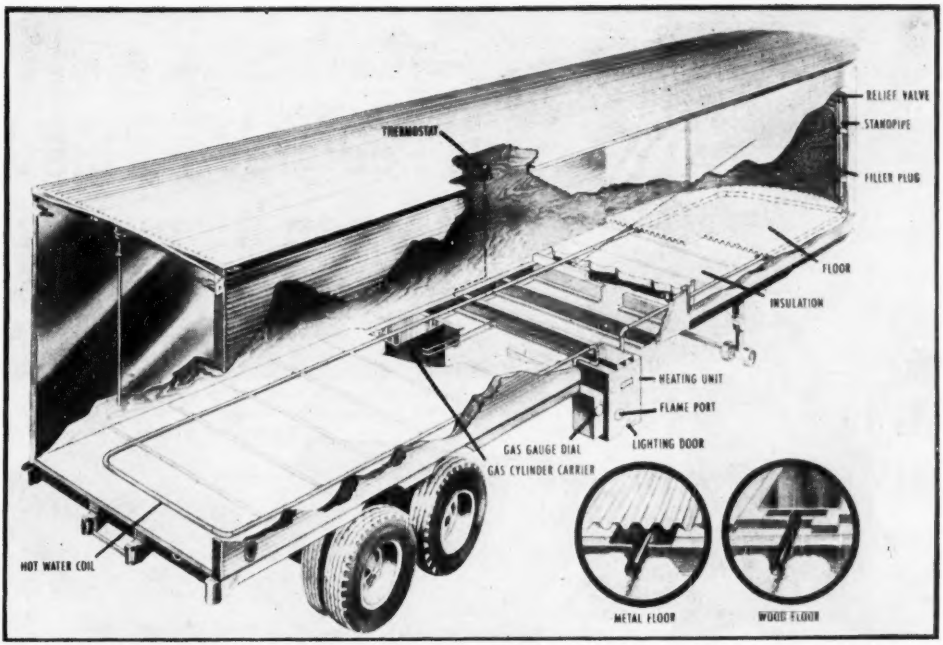
FRACTIONAL horsepower Howell motors, both single and polyphase, are usually carried in stock. Furnished in standard NEMA frames as either open or totally enclosed types.

HOWELL Red Band MOTORS

HOWELL MOTORS

HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

Precision-built industrial motors since 1915



INSTALLATION of Luminator radiant floor heater in typical trailer is seen in cutaway view. Hot water in loop is warmed with bottled gas in heater shown underslung beneath insulated floor.

Cargo Heater Gives Safe Warmth

Accidental freezing of perishables while in highway transit can be prevented with externally-mounted bottled-gas space heater

UNIFORM heating of food products in huge trailers or trucks, to prevent freezing in winter-time transit, is achieved by a new under-floor heater. It is an independent radiant system recently adapted to the job and proved successful in commercial operation.

Utilizing propane gas as the heat source, the system complies with the latest I.C.C. Motor Carrier Bureau proposal prohibiting heaters from exhausting products of combustion inside the vehicle body. The propane heating unit is mounted below trailer or truck floor and entirely outside the body.

While the use of radiant floor heating was first introduced to food transportation on the highway last winter, the principle is not new. It has been employed for over 20 years in the railroad industry, particularly in the cold weather belts of Canada.

The unit, designed specifically for the highway, consists of three main parts—the gas heating unit, a floor-mounted closed-circuit "hot water" pipe loop, and a holder and manifold system for propane gas bottles. Manufactured by Luminator, Inc., Chicago, the installation has many advantages:

■ **Uniform temperatures can easily be maintained throughout the load, since the air warmed by the floor heater tends to rise. This also prevents the danger of freezing at floor level while the top of the load is warm.**

■ **Fans are not required, since proper air circulation is assured through convection currents.**

■ **Entire cargo space is available for the payload—no valuable room being taken up by the heater elements. Also there is no possibility of damage to the heater itself through any shifting of cargo.**

■ **The unit is a complete, integral system functioning independently of all other parts of the trailer, truck, or tractor—no outside electrical connections being required.**

■ **Operation of the system may be completely observed from the outside through a series of gages and peepholes.**

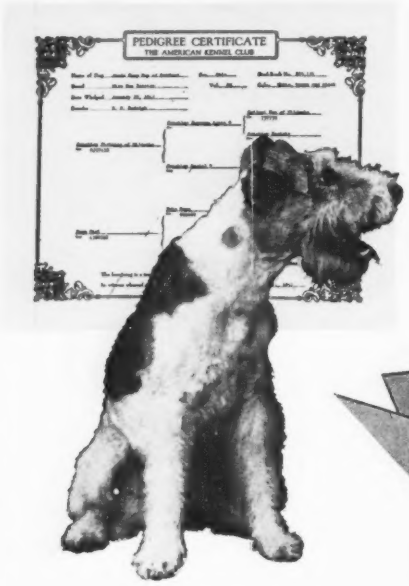
Each heater is job engineered and installed to meet the specific requirements of all types of truck and trailer bodies and the kind of food to be carried. The floor loop may be installed *in* either wood or metal floors or *on* floors of trucks using racks.

Main principle of this particular radiant floor heater is the same as that of the increasingly popular system used in private homes and some new industrial buildings—either thermal syphon or forced circulation of hot water in a closed floor or wall pipe loop.

Heat In a Hurry

The heater box, 19 in. high, 19 in. wide, and 14 in. deep, is mounted below the truck or trailer body with angle-type supports. The heater em-

THE WIRE-HAIRED FOX TERRIER came from England where it was once used by hunters in routing foxes from their hiding places. Lively, affectionate, and quick to learn, the Fox Terrier has been a very popular dog for many years.



A Pedigree is Fine but when it pays off It's Important!

LIKE purebred dogs, Union corrugated containers have a pedigree—an unbroken line of control going all the way back to Union-owned forests and mills.

But the important thing is that this pedigree *pays off* to users of Union boxes. Pays off in uniform quality, less breakage, and fewer returns.

That's because Union specifies and controls every step in manufacture. You can be sure that every carload of Union boxes measures up to the same standard of samples submitted or of previous orders.

The Sweets Company of America knows the importance of this, and ships its famous Tootsie Rolls to all America in Union corrugated boxes.

TRADE MARK UNION

Dependable Packaging Since 1872

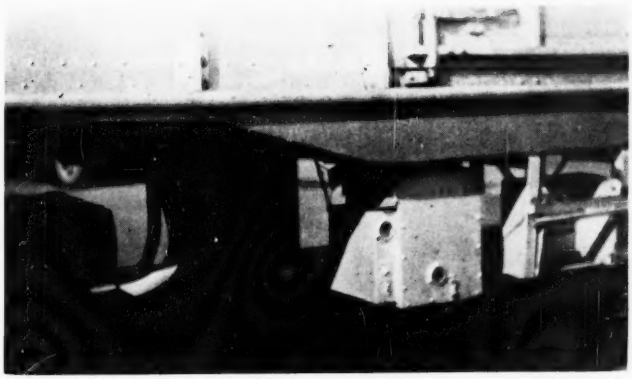
UNION BAG & PAPER CORPORATION
CERTIFICATE OF BOX MAKER
SAVANNAH, GA.

UNION Corrugated Containers

UNION BAG & Paper Corporation

Principal Offices: WOOLWORTH BLDG., NEW YORK 7, N. Y.

Corrugated Container Plants: SAVANNAH, GEORGIA • CHICAGO, ILLINOIS • TRENTON, NEW JERSEY



HEATING UNIT is just below side door, completely external to storage space in trailer—thus being easy to regulate and check. Peepholes and gages enable driver to observe operation of system.

ploys a double copper coil encased in an insulated tube.

The standard burner unit has a rating of 25,000 Btu. per hour, which has been found to be adequate in most cases. This size burner can quickly furnish enough heat to preheat the vehicle body for loading and bring temperatures back up to the desired level after partial unloading.

The "hot water" heating loop is connected to the ends of the heater double copper coil. The loop is usually installed between the floor insulation and decking—just below the latter. It parallels the walls of the trailer or truck, placed a few feet in from them.

Space for two gas cylinders is provided in the special cabinet—also mounted outside and below the vehicle body directly opposite the burner compartment. The cylinders are connected to the burner proper with pipes running through a manifold arrangement. The two bottles usually provide enough propane to last from two to four days, depending upon weather conditions.

Automatic switching from one bottle to another is a standard feature. As soon as the service cylinder is empty, the manifold changeover arrangement cuts in the reserve cylinder. Also built-in is a pressure regulator insuring proper gas pressure at the burner.

The propane bottled gas is the same as that used for rural homes and automobile trailers, and is therefore readily available on the highway.

In operation, the burner heats the water in the double burner coil. The hot liquid then circulates through the floor loop on the thermal siphon principle heating the entire floor area. Radiation then transfers the heat from the floor to the cargo space, and natural connection keeps the temperature uniform.

The temperature of the load is regulated with a thermostat mounted inside the vehicle body—at the midpoint of one of the walls, 12 to 18 in. down from the roof. The magnetic electric valves in the gas line are controlled by a pilot generator, based on the thermocouple principle. Sufficient current is generated to actuate the valves in accordance with the thermostat's request for heat.

Should the burner pilot light be extinguished for any reason, the flow of gas to the burner is immediately stopped. And then the pilot must be relighted before the valves will reopen, allowing the gas flow to be resumed. Port holes with sliding covers are provided on the burner box, to be used to check the pilot and the color of the main burner flame.

The closed "hot water" loop and double heater coil system is filled through a vertical tube inside the body at the extreme front end of the vehicle. The filler tube also serves as an expansion chamber and is fitted with a relief valve.

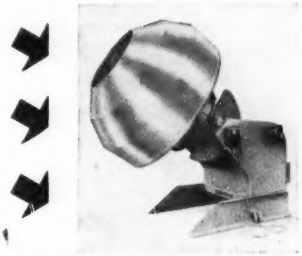
Anti-freeze can readily be mixed with the water in the closed system to bring the freezing point down to approximately 60 deg. F. below zero—if necessary. Standard ethylene glycol solutions are perfectly satisfactory.

Proved In Service

Over 50 Luminator installations have already been made in trailers and trucks in the East and Midwest. Among them are units owned by Winston & Newell Co., Minneapolis; M. D. Cressy Co., Boston; Dixon Tom-A-Toe Produce Co., Indianapolis; and The Champlain Valley Fruit Co., Burlington, Vt.

The engineered, automatic radiant flow heater now being put on the road is a far cry from the early, crude methods of attempting to prevent perishable foods from freezing—such as milk cans filled with hot water and

NO SCOOPING SCRAPING



Mix larger batches . . . mix more batches per day

WITH THIS WORTHINGTON RANSOME PAN-TYPE MIXER

The exclusive Ransome baffle design directs ingredients into two merging, fan-shaped formations . . . assuring a thorough mix in less time. The drum is *rotated* by motor and *tilted* by motor—and discharges, automatically and *completely*, as clean as a whistle.

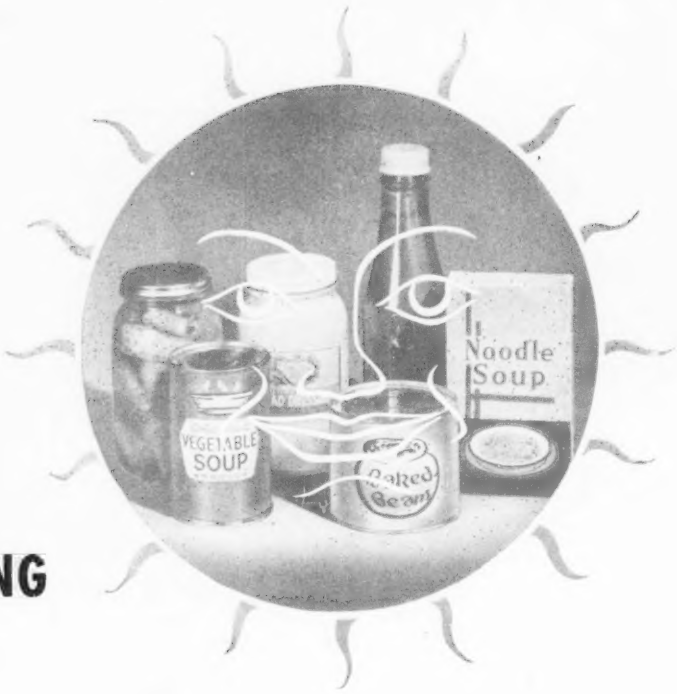
Capacities up to 3000 lb reduce handling and re-handling and increase output.

Write for Bulletin R-708 on Worthington-Ransome Mixers, built from designs developed from nearly a century of mixer experience.

WORTHINGTON

WORTHINGTON PUMP AND MACHINERY CORP.
RANSOME INDUSTRIAL MIXER DIVISION
DUNELLEN, NEW JERSEY 24YR.1.4

ROYAL SOLUBLE SEASONING



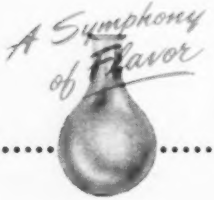
for Sunny-Day Flavor

ROYAL SOLUBLE SEASONINGS are truly distinctive—in flavor potency, purity and uniformity! Griffith has conquered the disturbing elements in nature! . . . eliminated the flavor variations in spices! And changed spice blending from an art to a science—with predictable, dependable results for spice users.

The secret to this new, high standard in flavor quality lies in Griffith's revolutionary extraction process*. It removes the disturbing strains in flavor . . . captures and measures the full potency of "true" flavors in spices.

Use ROYAL SOLUBLE SEASONINGS and improve your products with dependable, uniform *sunny-day* flavor. Write today.

*Patent Applied For.



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open charcoal burners placed inside the bodies.

Filling of milk cans with hot water required considerable labor for loading and unloading, and the method lost its efficiency as the water cooled off. Also, there were many hot spots—overheating of certain parts of the load, while the space around the floor was at best unevenly warmed.

Charcoal heaters brought this same disadvantage of local hot spots and the even greater hazard of fire. As the charcoal burned itself out, it became less and less efficient, and when the oxygen level dropped, the flame went out all together. Any fumes given off from the combustion threatened to taint the food, or accelerate its ripening (in the case of fruits or vegetables).

—End—

Inert Gas Guards Quality

—Continued from page 75

The device shown in Fig. 9 is used to test the headspace of canned products. It is connected to the gasometric unit with tubing, and the system is evacuated by manipulation of the leveling bulb and stopcocks. The stop is released, allowing the plunger to puncture the can and to release the gas into the desorber bulb.

A similar device can be used for screw cap closures after the threads are sealed to prevent drawing in air due to cap-liner leakage. Flexible film packages have a rubber patch cemented to them. A hypodermic needle connected to the gasometric unit by tubing is used for sampling the gas.

Nitrogen Protection of Oils

Nitrogen is commercially used to protect edible oils from oxidative deterioration during processing and storage in both bulk and consumer type containers. The method is diagrammed at beginning of article.

Nitrogen is injected into the oil as it comes from the deodorizer and cooler. A gas pressure slightly higher than that of the oil is used. Approximately 15 percent by volume of nitrogen is employed here. The oil then goes into a closed filter tank. Since the operation of this tank is intermittent, it is necessary to tie the headspace into the low pressure nitrogen system. This prevents drawing air into the tank as the oil is pumped out.

After the oil leaves the finish press, nitrogen may again be injected at the rate of 15 percent by volume so that the oil is thoroughly saturated. Then, upon being dropped into the finished oil storage tank, some of the nitrogen will evolve from the oil, preventing atmospheric oxygen pickup. It is important that all tanks employ bottom filling. The finished-oil storage tank should also be connected to the low pressure nitrogen system.

As the oil is pumped from storage tank to a tank car, nitrogen is injected at the rate of approximately

What's Coming Up in FOOD ENGINEERING

Slated for early issues of FE are practical articles a-plenty—every one aimed to aid you in doing a better job of making quality foods at low cost, with the accent on the "how." Just to name a few—

Plug Those $-Leaks by Streamlining Receiving Operations

Synchronous Motors Up Plant Power Factor

Aluminum: Where It's Used and Why in Modern Food Handling

That Handy Water Power Can Still Hold Its Own

Quality Berries by 4-Point Control

Varietal Characteristics Influence Browning of Frozen Peaches

Continuous Control Clinches Quality, Curbs Waste

Big Beverage Success

Builds Substantial Business in Novel Foods

Fast Handling, Special Pre-Chilling Put Profit in Prepackaged Produce

Simple Extruder Makes Skinless Sausage Links

How Bakery Executive Effectively Selects and Places Personnel

Thermoplastic Labeling Offers Many Advantages

Nitrogen Protects Color of Canned Red Cherries

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- ☐ APPAREL MFG.
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- ☐ AUTO SUPPLIES & PARTS MFG.
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- ☐ BAKERIES
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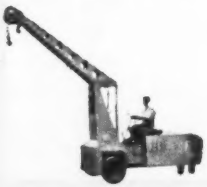

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115 percent by volume. This obviates the necessity of prepurging the tank car. As the oil enters the tank car, some of the nitrogen is released and sweeps out the air ahead of it. And by the time the tank car is filled, the headspace contains essentially no oxygen (or 100 percent nitrogen). The tank car is then capped and shipped with a nitrogen headspace to prevent oxygen pick up during shipment.

The low pressure nitrogen storage can be either of the breather-balloon or the gas-holder type. First diagram shows a connection to the high pressure nitrogen supply to permit purging the low pressure holder and supply makeup when necessary. It can thus be seen that atmospheric oxygen is prevented from entering the system at any time. Consequently, the oil is not permitted to absorb oxygen and will remain free of peroxides.

Nitrogen is injected or mixed into oil products such as mayonnaise, salad dressing, and margarine in order to fluff them or to control their consistency and reduce oxygen contamination.

End (*Resume reading on page* 176)

Open Pressure Cooker

—*Continued from page* 143

or redirect the natural circulation caused by convection currents. Such restriction develops some of the conditions for geyser formation originally described by Bunsen[8]. However, it has been found that water eruption from a hydrostatic cooker can be prevented by operating at a temperature somewhat below the theoretical boiling point for the pressures in use. Other precautions, such as heating only the bottom of the water column and cooling the upper sections, act as additional safeguards against geyser action.

Obviously, high boiling liquids or solutions could be substituted for water as the heating medium in hydrostatic cookers. Calcium chloride brines and, more recently, diphenyl, have been used for high temperature processing of canned foods in shallow open vessels.

Design Suggested

However, unneutralized internal can pressures often resulted in explosions, can deformations, or leakage; so this technic has fallen into disuse[8]. However, if the high boiling liquids were used in hydrostatic cookers, this objection would not be valid because these fluids also develop hydrostatic pressure which would be effective for counterbalancing internal can pressures.

For the NEW INSULATED ICE CREAM PACKAGE

"PACKAGE" produced a completely automatic set-up

The growing volume of packaged ice cream sold through self-service markets called for a package that would prevent the ice cream from melting while the housewife did her shopping. Corrugated material met the need. Its use, however, entailed considerable hand operations. So "Package" engineers went to work, and developed the completely automatic set-up shown above.

This tandem unit produces the new insulated ice cream package at a speed of 60 to 80 per minute. The specially designed Model FF machine at left uses corrugated material in large rolls. It cuts the material from the roll, slits it for end folds, then scores and forms it neatly around the entire carton. Automatically applies end seals that hold the folded ends of the corrugated wrap firmly in place. The cartons are then fed directly to the Model FF at right for final wrapping in printed waxed paper.

ONE OF MANY ACHIEVEMENTS

This is but one of the many achievements in supplying better, more economical packaging for which "Package" is noted. Whether your production calls for wrapping, cartoning or bundling, it will pay you to check with "Package" for the latest and most efficient methods. Consultation with one of our representatives involves no obligation.

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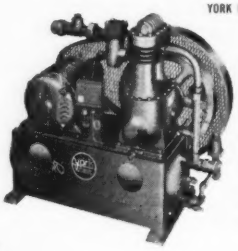
Cooling Hot Dough

● A York air conditioning system—regarded by Nabisco as one of the ultimates in dough conditioning—provides automatic temperature-humidity control plus filtering in the "sponge" and "proof" rooms.

In a peak month, York cools enough dough at National Biscuit Company's 4-city-block-long "baker's bakery" in Portland, Oregon, to girdle the globe!

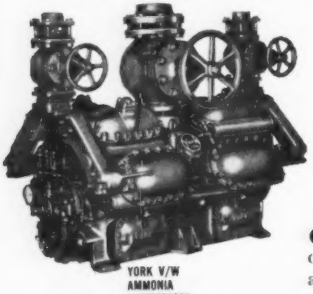
To maintain Nabisco's ultra-high standards in this new plant—one of the world's most scientifically equipped and operated—York cooling equipment was chosen *throughout*—from the storing of raw materials to the cooling of dough to the packaging of the crackers in wax paper.

YORK FREON CONDENSING UNIT—5 HP.

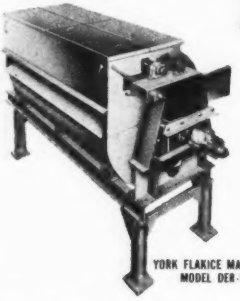


◆ York Freon-12 condensing units cool storage spaces equal to 8400 ten-cubic-foot refrigeration units. 4 York 5-hp. Freon condensing units chill the icing in the "enrobers."

◆ A York V/W Ammonia Compressor—in the ingredient water system—lowers Portland city water to 33° F.



YORK V/W AMMONIA COMPRESSOR



YORK FLAKICE MACHINE MODEL DER-150-A

◆ York FlakIce Ribbons cool the mixes in the preparation of certain baked goods.

● Even wax paper in storage is cooled by York to prevent damage from heat due to pressure.

Nabisco is only one of the many successful applications of York cooling equipment to food processing. Time and time again, from one end of a plant to another, York equipment is selected to do the job. From first cost to last, York is more economical . . . delivers a higher calibre performance. Up-to-the-minute managements profit from the product research and development that have made York the leader and pioneer in air conditioning and refrigeration.

When you need air conditioning or refrigerating equipment, call your York Representative (in your Classified Directory) or write York Corporation, York, Penna.

York refrigeration air conditioning

The big advances come from YORK

Headquarters for—**Refrigeration and Air Conditioning**

The principle of hydrostatic cooking should be adaptable to continuous thermal processing. A "U" tube design and an endless chain carrier for the cans would permit the use of one of the vertical legs for preheating and the other for cooling while the horizontal section would be used for cooking. Considerable heat saving should be possible with this system.

In addition, this design would require neither entrance nor exit valves, which should simplify its adaptation to packages of different size, shape, and composition. Also preheating and cooling would be carried out under hydrostatic pressures that gradually increase to and decrease from the cooking pressure.

Clifcorn *et al.*[4] have shown that end-over-end agitation materially reduces the processing time for canned foods. Adoption of this principle in the design of a continuous hydrostatic cooker should result in an apparatus of feasible size.

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4. Clifcorn, L. E., Peterson, G. T., Boyd, J. M., and O'Neil, J. H., "A New Principle for Agitating in Processing of Canned Foods." *Food Technology* 4: 450 (1950).

End (*Resume reading on page* 145)

Roquefort-Type Flavors

—*Continued from page* 93

dedueed that a major portion of the blue cheese flavor is likewise soluble in fat.

Experiments in our laboratory at Pennsylvania State College have revealed that the above deduction is correct, and may be utilized in practice as follows: Well-ripened cheese (the stronger the flavor the better) is melted down in a hot water bath and then extracted with a vegetable oil of the type used on salads. After extraction, the oil is decanted, clarified, and used as such. Or this oil may be emulsified with an aqueous phase containing salt, vinegar, and other flavoring, to yield a complete and naturally flavored Roquefort-type dressing. Extraction of the cheese with about five times its weight of salad oil yields a product with suitable flavor intensity. However, several extractions seem advisable in order to remove as much flavor as possible.

Although no uses have yet been developed for the extracted cheese, it still has some flavor and considerable

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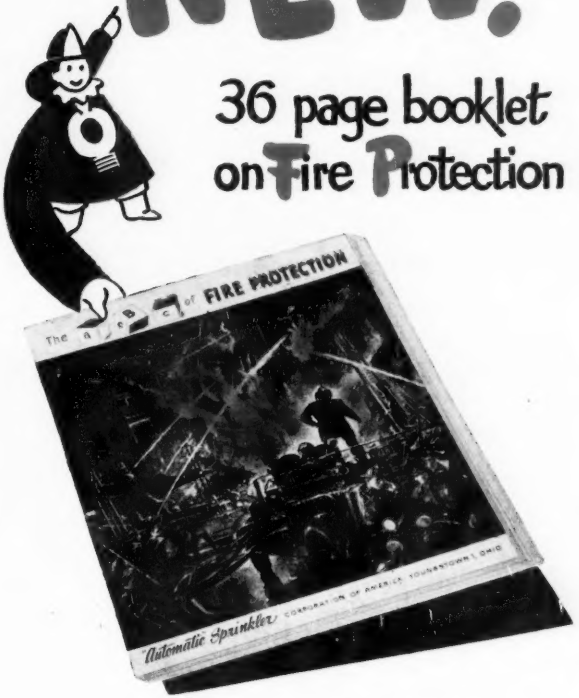

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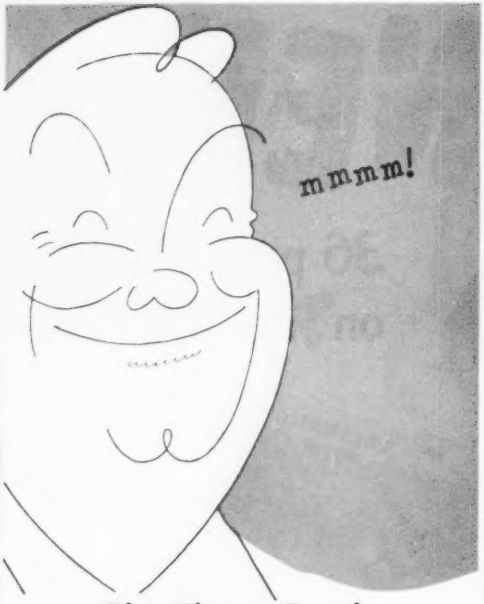

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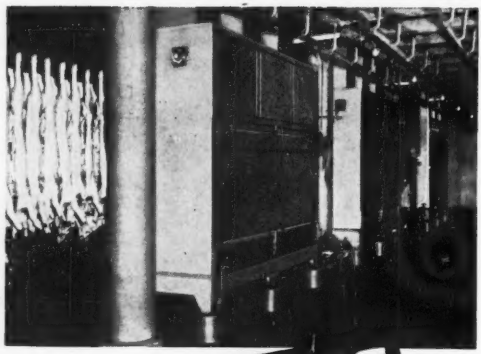

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Like meat plants and food processors from one end of the country to the other, Dubuque Packing Company has found that it pays to use Vilter refrigeration equipment. In plant after plant, you find Vilter re-ordered time after time for 10 years, 30 years, or 60 years . . . because these plants know that Vilter saves them money in upkeep, in operating costs, and in lack of wasteful "down-time."

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food value. Conceivably, it could be employed as an ingredient in cream sauces, canned soups, cheese spreads, and cheese-flavored crackers.

A further characteristic of blue cheese flavor which may have practical value is its volatility with steam. Steam distillation rather rapidly concentrates a substantial portion of the aroma. Use of this distillate for flavoring purposes, as compared with cheese itself, has the following advantages: It does not serve as a source of microbiological contamination, and it imparts no off-color or undesirable physical properties.

Synthetic Blue Cheese Flavor

On the assumption that ketones as well as the lower fatty acids are involved in the flavor of mold-ripened cheeses, experiments were conducted in an effort to develop a synthetic blue cheese flavor. Impartial observers invariably chose methyl amyl as being the ketone most typical of blue cheese aroma. However, this compound, when used alone as a source of the flavor, imparted too much of an aromatic quality. Addition of a fatty acid, particularly butyric, seems to aid in "rounding out" the flavor.

This combination is not necessarily ideal, nor is the resulting flavor invariably indistinguishable from natural blue cheese essence. Nonetheless, observers at this laboratory have never mistaken it for something other than that of blue cheese. Use of caproic and caprylic acids, in conjunction with butyric, does not appear to give a flavor concentrate superior to that obtained with methyl amyl ketone and butyric acid alone.

A concentration of 1 part by volume of methyl n-amyl ketone to 20 parts of butyric acid, when added at the rate of 1 fl. oz. to 8-10 gal. of salad dressing base, will impart a mild, pleasant blue cheese flavor. The pure acid and ketone are readily available from most organic chemical supply houses.

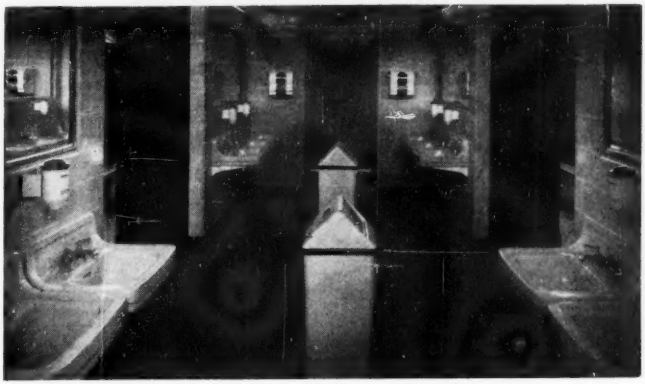
The matter of toxicity can hardly be problematical since the presence of traces of these compounds in natural cheese has been firmly established. In addition, the use of more than extremely small quantities of either compound renders the flavor of a product insufferable.

Perhaps the most evident and practical application of the synthetic flavor concentrate, however, would concern fortification of products containing natural cheese flavor.

The above article is taken from Paper No. 1671 *in the Journal Series of The Pennsylvania Experiment Station.*

End (*Resume reading on page* 94)

Washroom walls of KRAFTILE Glazed Structural Wall Units at the Torrance (Calif.) Works, American Radiator & Standard Sanitary Corporation. Prack & Prack, Architects.



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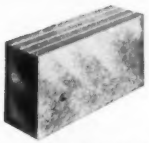
★ **WORKERS LIKE 'EM** because they're clean and sanitary, make attractive working surroundings, and provide excellent light reflection.

★ **MAINTENANCE MEN & JANITORS LOVE 'EM** because they are practically mar and scuff-proof; dirt, grease (even lipstick) wipes off with the swipe of a cloth... yet they can be scrubbed daily with washing compounds or disinfectants without dulling their original beauty.

★ **CUSTOMERS AND VISITORS** get a prestige-building impression of KRAFTILE-walled plants and offices, give credit to shrewd management for good sense in selecting wall material that *makes money* by *saving money*... yet provides eye-catching attractiveness in the bargain!



THIS IS A GLAZED STRUCTURAL WALL UNIT—a structural clay tile with a fired-on glazed surface on one or both sides. Available in clear glaze or in attractive colors... a "pre-finished" wall material with these important advantages:

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★ **LIFETIME ATTRACTIVENESS**—never needs painting, can't fade, highly resistant to scratching and scarring. Pencil, crayon, lipstick, grease marks wipe off easily. Unaffected by water, steam, most acids, alkalis.

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NEW PACKAGES & PRODUCTS

Fits Into Freezer

Cuts Into Sections

Stores Remainder

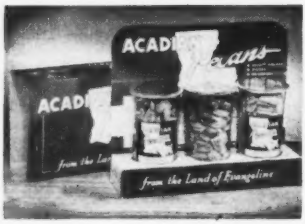
Serves Four Portions

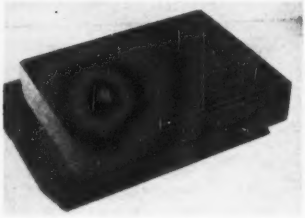
3-Time Use Featured In Ice Cream Pack

A half-gallon ice cream container that can be divided into three sections has been introduced by Continental Can Co.'s Paper Container Div., New York City.

The carton, called "Cut-A-Pak," is designed to fit into a refrigerator freezing compartment. It is scored for cutting in two places. Each section holds 1⅓ pt. of ice cream, an average of four servings.

The user cuts off the top-third of the package, then replaces the cover on the reduced carton and puts it back in the freezer. Ice cream is dipped and served from the separated section.





Gift Boxes Double As Sales Displays

New gift boxes which serve double-duty as point of sales displays are being utilized for the holiday season. This type of packaging not only presents gift-package appeal in an attractive display, but also stimulates related-item purchases and eliminates repacking time by the retailer. It is expected this type packaging will result in a big boost in holiday sales.

Among such items are the following:

Three varieties of Acadian pecans, including halves, pieces, and granules, gift packed by Louisiana Pecan Shellers, Inc., St. Martinville, La.

These nuts are vacuum-packed in glass tumblers in sets of three. They are placed in a unit gift and display carton. The package design is in colorful yellow and blue with the "Land of Evangeline" theme throughout.

Glasses are supplied by Owens-Illinois Glass Co., Libbey Glass Div., Toledo, Ohio; metal closures by Anchor Hocking Glass Co., Lancaster, Ohio; labels by Muirson Label Co., Brooklyn, N. Y.; and containers by Central Carton Co.

"Table Treasures" contains an assortment of fancy gourmet delicacies distributed by Bradens California Prod., Inc., Cleveland.

These products are gift-boxed in a design of red on green embossed board. Shredded cellophane and corrugated dividers hold jars of foods securely in the box.

Corrugated boxes are supplied by The Hinde & Dauch Paper Co., Sandusky, Ohio.

Meat In Half-Can Pack

Following the growing trend toward products in small containers, Geo. A. Hormel & Co., Austin, Minn., is now marketing its chopped ham in the half-can version. This brings to a total of five the number of items the company is offering in this small size.

Other items include corned beef hash, spaghetti and beef, roast beef hash, and beans with ham.

Label design for the new chopped ham item is by Batten, Barton, Durstine & Osborn, Inc., New York City. Cans are supplied by American Can Co., New York City.

For More Data on Package Supplies Named Use Reader Service Card

For outstanding glass performance
—ARMSTRONG

Try these fine-quality containers and you'll agree with hundreds of other users—Armstrong containers help keep filling lines flowing smoothly. Their uniform finish and carefully formed base contours step up bottling speed . . . cut downtime to a minimum. What's more, this durable glassware gives long, dependable service in the field.

If you want to improve the appearance and performance of your container, chances are Armstrong can be a big help to you. Just call your near-by Armstrong representative or write direct to Armstrong Cork Company, Glass and Closure Division, 9312 Prince Street, Lancaster, Pennsylvania.

there's always room for higher quality!

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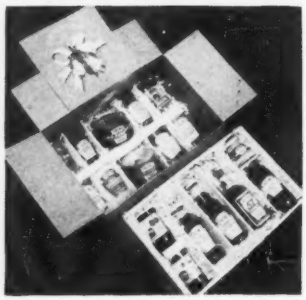


Gift Packages Featured for Holiday Trade

Among the special holiday offerings this year (see photos) are cookie treats, mint cartons, cranberry packages, and jelly, dessert and sauce assortments.

New cookie packs are being marketed this year by Carr-Consolidated Biscuit Co., Wilkes-Barre, Pa. "Christmas Animals", a new item, consists of a colorful assortment of white, pink, and chocolate animal crackers, packed in 6-oz. cellophane Christmas stockings which are red-back and green-back with a clear front. "Fancy Tricks", is being repeated from previous years since it has proven to be a party favorite. The assortment consists of small vanilla-flavored cookies, shaped in hearts, diamonds, etc., generously sprinkled with nonpareils. This item is packed in a holiday designed 2-lb. container.

Also being added this year are several "bulk" items. These include Christmas trees, liberty bells, and large animals. They are vanilla, anise flavored items, enrobed with pure chocolate coating, and sprinkled with nonpareils.

Santa Claus, dressed in his red and white suit and riding a green sleigh, decorates Life Saver Corp.'s, Port Chester, N. Y., Christmas book carton.

It is made of shiny silver Foiline, printed in three colors, and contains 12 rolls of candy. Inside the book are two drawers with pull tabs and cellophane windows for protection and visibility of the product. Top and bottom of cartons are printed to resemble leaves of a book while the back is printed like a bound volume and has a Christmas tree for decoration. Design is by Robert Gair Co., Inc., New York City, supplier of the packaging materials.

Holiday gift assortments for both retail trade and for use as gifts by firms are being offered by H. J. Heinz Co., Pittsburgh.

A two-layer corrugated carton containing 17 popular foods—jellies, desserts and sauces—are attractively boxed. Envelopes, gift cards and mailing stickers carrying the holiday motif are included in this offer. A six-variety gift box of table jellies, including apple, mint-flavored apple, grape, quince, cherry and raspberry, is also being marketed.

Cranberries, the traditional holiday fare, are making their appearance in new attractive packages. The "Eatmor" package has been standardized for use by all members of the American Cranberry Exchange. The color scheme is a cool blue-green and white, providing contrast and eye appeal for the red cranberries. In addition to the two recipes on the carton, instructions for freezing storage are given. Carton is varnished so it can be slipped into freezer without further wrapping. Package design by Jim Nash, New York City.

Spread Ingredient Offered

High-acid homogenized salad dressing, pimientos, and pickle relish are now being offered by Wass Food Products Co., Chicago, for the manufacture of sandwich spread out of production ends, breakages, and other leftovers in the meat-packing plant.

The spread is prepared in the following manner: Grind 300 lb. of assorted meats (sausages, and other prepared meats) through a $\frac{1}{8}$-in. plate and 80 lb. of drained sweet pickle relish and 6 lb. of liquid pimientos through a $\frac{1}{4}$-in. plate. Mix meats, pickles, and pimientos with 2 lb. of sifted sugar, 6 lb. of salt, and 30 lb. of binder (cracker meal, precooked binder, or milk powder). Blend mixture with 102 lb. of the salad dressing. Then stuff into casings.

Pimiento Peppers

As a special stimulation to trade, the processors of pimiento peppers are this year processing the peppers in new dress. In addition to the standard tin can, several companies are now using glass jars to get eye-appeal.

Pomona Products Co., Griffin, Ga., is packing its "Sunshine" brand whole pimientos in 4-oz. and 7-oz. glass jars, and pimiento strips in 2-oz. jars. Tin can pack includes 4, 7, 14 and 28-oz. whole pods. Broken pods are also packed in 28-oz. tins for food processors. And there is a 28-oz. whole-pod pack for hotel and restaurant trade.

For its "King Pharr" brand, King Pharr Canning Operations Inc., Cullman, Ala., is using 4-and 7-oz. jars, furnished by Owens-Illinois Glass Co., Toledo, Ohio. Closures are supplied by White Cap Co., Chicago.

Precooked Barley Cereal

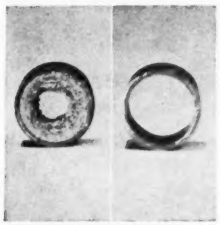
Bringing to three its line of precooked baby cereals, H. J. Heinz Co., Pittsburgh, is now marketing precooked barley cereal. Precooked oatmeal and cereal food are other items.

Sold in 8-oz. cartons, the barley is recommended for convalescents, persons on a soft diet, and infants.

3 ways to Increase Production

Steam-cleaning juice extractors cuts hours off cleaning time

Spraying potent Oakite germicide reduces spoilage



Photographs of water pipe before and after it had been descaled with Oakite Compound No. 32.

1 **Equipment cleaning:** Oakite Steam-Detergent Gun hits soils three ways at once—with heat, force, powerful detergent action. Gun cleans and rinses at the twist of a valve; penetrates even hard-to-reach areas and up to 12 feet above working level. Tops for getting blanchers, conveyor belts, heavy equipment *back in service faster.*

2 **Reduce spoilage through effective bacteria control:** Oakite Bactericide releases *more* active form of available chlorine to kill more bacteria *faster.* Oakite Sanitizer No. 1—quaternary ammonium compound—prevents recontamination for relatively long periods. Controls slime and algae, too. Excellent for treating recirculated water and water in wine-holding vats between seasons.

3 **Top Equipment Performance:** Descale circulating units and heat exchangers with Oakite Compound No. 32, acidic material inhibited against attack on metal surfaces. Quickly, thoroughly dissolves hard water scale, lime deposits, rust. No rodding or drilling out—no dismantling.

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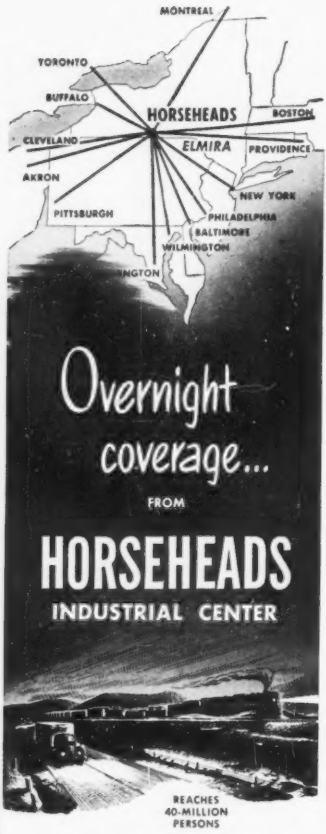

New In-Transit Point East or West Offers Distribution Savings

Complete warehousing service now offered at Horseheads

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Horseheads Industrial Center is served by 30 truck lines and 4 railroads: D. L. & W., Lehigh Valley, Erie, Pennsylvania. *New construction* offered on low-rental basis, for storage, processing, assembly.

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Horseheads, N. Y. or
98 Frelinghuysen Ave., Newark, N. J.

Quick-to-Make Jelly In Three Flavors

A new packaged jelly mix, called "TobyJell", has recently been put on the market by American Brands Corp., Redwood City, Calif.

A dehydrated mix, the product contains sugar, dextrose, fruit pectin, citric acids from citrus fruits, concentrated fruit juices, and vinegar. Artificial flavor and U. S. Certified color have been added. The mix now comes in three popular flavors—currant, grape and raspberry.

It is packaged in a heat-sealed glassine bag which is placed in a chipboard carton. Also enclosed in the carton are colorful identification labels to place on the filled glasses. The 3-oz. carton is overwrapped with gleaming foil in the three flavor colors which enable the consumer to select her flavor by the color of the package.

Each 3-oz. package fills seven 6-oz. jelly glasses. It is necessary only to add the mix and sugar (complete directions are given on back panel) to boiling water, boil for one minute and pour into glasses.

Foil wrap is supplied by Reynolds Metal Co., Richmond, Va.; chipboard boxes by Charles Schmitt, San Francisco; labels for glasses by H. S. Crocker Co., Inc., San Bruno, Calif.; corrugated shipping cases by Schmidt Lithograph Co., San Francisco.

Specialty Items Becoming Standard Fare

Pre-cooked frozen foods used to be restrictively considered as specialties. However, Louis L. Libby Food Products, Inc., Long Island City, N. Y., is now winning standard-fare dealer and consumer acceptance for its line of pre-cooked frozen seafoods, onion rings, and a brand new item—Southern fried chicken.

The company has been making its

strides through an extensive campaign of radio and newspaper advertising to acquaint and educate the public regarding its products. Its items are now being distributed along the East Coast and as far west as Cleveland, with national distribution planned in the near future.

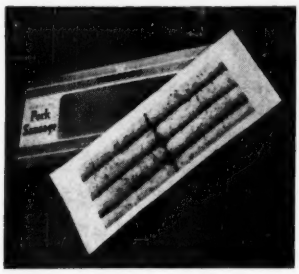
The seafoods include shrimp, scallops, flounder, smelts, codfish, haddock and codfish cakes.

The new item, Southern fried chicken, is available in whole or halves. Only Rockingham chickens, processed in a modern plant at Timberville, Va., are used. In less than 2 hr. the chickens are killed, dressed, cooked, frozen and packaged.

These products are dipped in a rich batter of milk, fresh eggs, flour, and seasonings. Then they are fried in vegetable oil to a uniform crisp, golden brown and "flash-frozen".

It is necessary only to oven-heat for a few minutes to serve—no thawing, just heat and serve. They may also be served "unheated" at room temperature "as is".

Each is packaged in a waterproof carton, with a waxed filler inside and an overwrap of cellophane. The packages are in a colorful red, white, blue and yellow, with a distinctive red "L" trademark of the company prominently displayed. Design is by The Marathon Corp., Menasha, Wis., who also furnishes packaging materials.



Display Inserts

Liberal point-of-sales displays in retail meat stores have been obtained by Wilson & Co., Chicago, through use of special lithographed-strip reproductions of product pasted inside empty window-type sausage cartons.

Formerly, if displays were made at the meat counters of retail outlets using cartons containing sausages, some deterioration of the meat was to be expected. Such displays were kept at a minimum, or avoided entirely.

Now, the lithographed strips pasted inside empty containers have the realistic appearance of the fresh product in the package. Displays may be generous, giving more sales-impetus.

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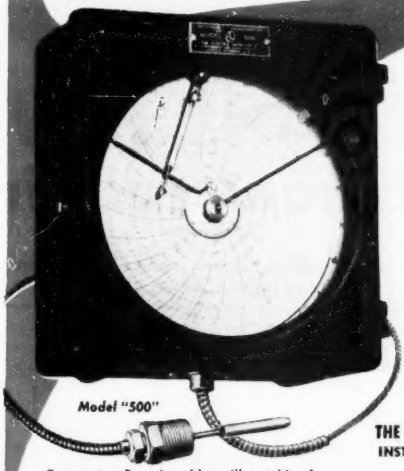
...for TEMPERATURE RECORDING

★ This low-cost protection gives permanent proof of temperature behavior.

★ Various standard chart ranges from minus 40°F. to plus 550°F.

★ 3 standard types; choice of 24-hr. or 7-day cycle.

Send for new catalog G-143-8, describing many styles of Auto-Lite temperature indicators and recorders.



Temperature Recorder with capillary tubing for EYE-LEVEL reading. Priced from $42.50.

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Sparkler filters are completely enclosed; are available in capacities up to 5000 G.P.H.; constructed of stainless steel or a variety of other metals to meet the requirements in filtering food products. All surfaces of the filter plates are thoroughly accessible for cleaning and insure a degree of sanitation impossible to equal with permanently assembled filter plates.

Diatomaceous earth, carbon or any filter aid and filter paper, cloth or any medium can be used with maximum efficiency. Flow through filter is always with gravity. The horizontal plates permit filter aids to be floated into position to form a cake of even thickness, filtration takes place uniformly over the entire filtering area. The patented scavenger plate filters the last drop, leaving no hold over in batch filtration.

We invite correspondence on your problems.

A few food products that Sparkler filters handle with ease:

Candy Scrap	Gums	Alkalies
Chicken Broth	Liquors	Beverages
Cider	Milk	Lard
Egg Albumen	Molasses	Deep Frying Fats
Extracts	Syrups	Beet Sugar Syrup
Flavors	Vinegars	Beer
Honey	Fruit Juices	Wines
	Alcohols	

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Special Note: First published in 1947, this review of enrichment requirements in the U.S.A. is now brought up to date by the inclusion of milled white rice, the latest grain food to be fortified with vitamins and minerals. This year, the Tenth Anniversary of white bread and flour enrichment, is an appropriate time to publish a new edition of this popular, helpful resume. We shall be pleased to supply extra copies gratis. Just write our Vitamin Division.

The ROCHE REVIEW of enrichment requirements

ALL FIGURES REPRESENT MILLIGRAMS PER POUND

PRODUCT	Thiamine (B_1)		Riboflavin (B_2)		Niacin		Iron	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
Enriched BREAD, or other baked products	1.1	1.8	0.7	1.6	10.0	15.0	8.0	12.5
Enriched FLOUR[1]	2.0	2.5	1.2	1.5	16.0	20.0	13.0	16.5
Enriched FARINA[2]	1.66	–	1.2	–	6.0	–	6.0	–
Enriched MACARONI products[3]	4.0	5.0	1.7	2.2	27.0	34.0	13.0	16.5
Enriched NOODLE products[3]	4.0	5.0	1.7	2.2	27.0	34.0	13.0	16.5
Enriched CORN MEALS	2.0	3.0	1.2	1.8	16.0	24.0	13.0	26.0
Enriched CORN GRITS[4]	2.0	3.0	1.2	1.8	16.0	24.0	13.0	26.0
Enriched MILLED WHITE RICE[5]	2.0	–	*		16.0	–	13.0	–

1. *In enriched self-rising flour, calcium is also required between limits of 500-1500 mg. per pound.*
2. *No maximum levels have been enforced.*
3. *Levels allow for 30-50% losses in kitchen procedure.*
4. *Levels must not fall below 85% of minimum figures after a specific rinsing test described in the Federal Standards of Identity.*
5. *Levels must not fall below 85% of levels shown after washing and rinsing.*

Omitted in the U.S.A. and Puerto Rico but used in certain Far Eastern countries to a minimum level of 1.2 mg. per pound.

The maximum and minimum levels shown above for enriched bread, enriched flour, enriched farina, enriched macaroni, spaghetti and noodle products, enriched corn meal and corn grits are in accordance with Federal Standards of Identity or State laws. Act No. 183 of the Government of Puerto Rico requires the use of enriched flour for all products made wholly or in part of flour. This includes crackers, pretzels, etc.

The levels for milled white rice are officially those of the Government of Puerto Rico. These levels are commonly accepted in U. S. domestic and export marketing and are based on the recommendation of the Committee on Cereals, Food and Nutrition Board, National Research Council.

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ADVANCES IN TECHNOLOGY

Feeding and Resting Hogs Before Slaughtering Results in Greatly Improved Bacon Quality

Controlled experiments on albino rats support the practical observation that animals in a state of fatigue and starvation yield meats of undesirably high pH. Lactic acid content of livers and hind legs and pH of foreleg muscles were determined after allowing the glycogen in them to be converted to lactic acid during overnight storage in a refrigerator. Results indicate that, in rats, moderate exercise plus 24 hr. of starvation depleted muscle reserve glycogen seriously. On a high-sugar food intake the reserves were restored in about 6 hr., but experiments on hogs indicate that 8 hr. is necessary for larger animals.

Instead of the current practice in Canadian packing plants, where hogs arrive fatigued, are held overnight without feeding, and are then exercised more or less vigorously on their way to the shackling pens, it is suggested that the animals be fed an oatchop-molasses ration on arrival and be given a rest of 6 hr. before slaughter. If the hogs are not subjected to severe exercise before slaughter, this treatment should result in considerable improvement in export bacon quality.

Digest from "Depletion of Carbohydrate Reserves by Starvation and Exercise," by D. Rose and Ruth Peterson, *Canadian Journal of Technology*, 421-27, Oct. 1951.

Effect of Storage Temperatures On Liver-Sausage Shelf Life

Even when poorly refrigerated, growth of microorganisms in liver sausage and bologna packaged in Saran is delayed for two weeks or more. But both spoil rapidly when held at, or near, room temperature.

Previous studies with liver sausage stored at 41 F. showed that a single layer of Saran prevented growth of organisms and discoloration caused by absorption of oxygen. However, this temperature is not frequently found in stores. So experiments were conducted to determine keeping qualities of both liver sausage and bologna at 51, 61, and 86 F.

Sausage held at 86 F. had a normal appearance after 3 days although there was abundant growth of both *M. candidus* and *M. epidermidis*. After 6 days much gas had formed, the number of organisms was considerably higher, and the pH had risen.

At 61 F. sausage showed no microbial change until the 19th day and appeared normal until the 52nd day, after which it was slightly softer than originally. No change occurred in the flora and pH of sausages stored at 51 F. or below.

A similar trend was shown in the case of bologna. When held at 86 F., organisms multiplied rapidly for 3 days, gas was evident at 6 days, and a greenish discoloration appeared by 15 days. Predominant organism was *M. candidus*. At 61 F., the first bacterial growth was evident at 16 days. Normal appearance was retained for 32 days after which it became slightly softer than normal. *M. candidus* was found after 85 days at 51, but not at 41 F. during 106 days.

Digest from "Effect of Temperature of Storage on Microbial Changes In Liver Sausage and Bologna," by P. K. W. Steinke and E. M. Foster, *Food Research*, 372-76, Sept.-Oct. 1951.

BAKING

Flour From Lab Conditioner Duplicates Milled Products

Conditioning of wheat prior to milling makes a marked difference in its properties, and can also affect the physical properties of doughs made from the flour.

It is possible to predetermine the optimum conditioning treatment by using a laboratory apparatus containing humidifying, conditioning and drying units, that will treat 5 kg. (11 lb.) of wheat. The equipment is self-contained and wheat to be treated is first put into a humidifying chamber where it is mixed (by means of a vertical screw elevator) with a measured amount of water. The conditioner proper next gets the wheat, and (again by means of a vertical screw elevator) passes it over the surface of a hot water-heated radiator controlled to any desired temperature.

The wheat is then cooled in an air-blast elevator system and allowed to rest as desired before milling.

By milling samples both with conditioning (in a series of ways) and without it, the optimum treatment for wheat of different varieties and different crop years is readily determined.

Digest from "Laboratory Conditioning of Wheats," by R. Michelli, *Revue des Fermentations et des Industries Alimentaires*, Vol. 6, No. 4, 116-23, August 1951.

FRUITS & VEGETABLES

Non-Frozen Apple Concentrate

A full-flavor, 7-fold apple juice concentrate that can be kept for a year at 35 F. and reconstituted with cold water to give a high-grade single-strength beverage has been developed at Eastern Regional Research Laboratory, Philadelphia.

Blended juice from several varieties of sound mature apples is concentrated at a vacuum of not less than 28½ in. to 71 deg. Brix with recovery of volatile esters. This concentrate is depectinized at 70 F. or below, filtered, then flashed to 210 F. to inactivate the pectinase.

The essence is added back (at a rate of 4.9 gal. to 100 gal. conc.) to yield a product of 68.5 Brix. This concentrate is chilled to 40 F. filled into 6-oz. laquered cans and stored at 35 F. When reconstituted with 6 parts of cold water the juice resembles a high-

INDEX TO ABSTRACTS

MEATS
Feeding and Resting Hogs Improves Bacon Quality 167
Effect of Storage Temperatures On Liver-Sausage Life 167

BAKING
Flour From Lab Conditioner Duplicates Milled Products ... 167

FRUITS & VEGETABLES
Non-Frozen Apple Concentrate .. 167
Cold Storage Aids C Retention .. 168
Oxidation of Apple Juice 168

CONTROL METHODS
Testing Vinegar Bacteria 169

CONFECTIONERY
Gaging Moisture Absorption in High-Sugar Foods 170

BREWING
High Temperature Hop Extraction 170

FERMENTATION
Yeast From Sulfite Liquor 171

DAIRY
Gelatinous Cottage Cheese 172
Vitamin A in Butter 172

MISCELLANEOUS
Algae Grown Continuously 175

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grade, clarified, single-strength processed juice.

Flow diagram and cost estimates for equipping a plant to handle 417 gph. fresh juice is included.

Digest from "High-Density, Full-Flavor Apple Juice Concentrate," by R. K. Eskew, C. S. Redfield and G. W. M. Phillips, ERRL, Philadelphia 18, Bulletin AIC-315, Aug. 1951.

Cool Storage of Canned Foods Aids Ascorbic Acid Retention

Tomato paste loses ascorbic acid at a more rapid rate than tomato juice when these products are stored for varying periods of time. High retention in both products was obtained for 24 months, however, by storage at 50 F.

Comparable packs of tomato juice and tomato paste in 6- and 8-oz. cans were prepared at 3 commercial canneries. Samples were then stored at 50, 70, 85, and 100 F. Initial ascorbic acid determinations were made within 4 to 7 days after packing, and at various periods during storage from 12 to 24 months. Data show conclusively that, at each storage temperature, tomato paste loses ascorbic acid at a more rapid rate than tomato juice, and that temperature has a profound effect on rate of loss. Thus high temperatures have a much more deleterious effect on the paste than on the juice. Canning procedure, initial level of ascorbic acid, and minor variations in copper content had little effect on the rate of loss of ascorbic acid. Minor amounts of dehydroascorbic and diketogulonic acids were found in samples stored at all temperatures for the maximum period. Desirability of cool storage for canned foods in general is considered even more important for concentrated products such as tomato paste.

Digest from "The Nutritive Value of Canned Foods: The Effect of Storage on the Ascorbic Acid Content of Canned Tomato Juice and Tomato Paste," by F. C. Lamb, L. D. Lewis, and D. G. White, *Food Technology*, 269-75, July, 1951.

Oxidation of Apple Juice

Browning of apple juice is accelerated by the action of fruit enzymes and oxygen, which it continues to absorb after processing. Oxidation may not take place at once but continues after clarification and promotes hazes and turbidities in bottled juice (more rapidly in sterile-filtered juice than in the pasteurized bottled product).

Additions of H_2O_2 accelerate the oxidation effects and can, therefore, be used to demonstrate effects of different varieties of apples. Juices of cider apples are more prone to sedimentation than those of other

varieties, and should not be used in apple juice blends. Since natural oxidation and sedimentation takes place more freely and completely in tanks than in bottles, preliminary storage prior to bottling is advisable. Pasteurization at 145 F. does not completely inactivate the oxidase system. Nevertheless, higher pasteurization temperatures can effect flavor adversely and should be used with caution.

No adequate antioxidant has been found for apple juice. Ascorbic acid has some deterrent action, but does not suppress turbidity completely. Both oxidation and reduction systems occur and the final state of oxidation and turbidity will depend on relative concentration of oxidant, reductant, molecular oxygen, and oxygen acceptors (tannin).

Digest from "Oxidation in Apple Juice. III. Oxidation Turbidities," by C. R. Marshall, *Journal of the Science of Food and Agriculture*, 342-47, August 1951.

CONTROL METHODS

Testing Vinegar Bacteria

A simple laboratory generator, that permits checking of vinegar bacterial strains for their acetic-acid producing powers, consists of a glass tube, 30 cm. high x 4 cm. in dia., closed top and bottom with stoppers carrying tubes for adding nutrients and air, permitting escape of gases, and withdrawal of samples.

Cultures isolated from shavings taken from plant generators are maintained on slants of wort agar containing 5 percent ethyl alcohol, 0.5 percent acetic acid, and 0.5 percent calcium carbonate. After 3 days at 86 F. bacteria are transferred to the tubes, and finally to flasks containing 200 ml. of a similar medium (made without $CaCO_3$) for 4 or 5 days growth.

In the generator the medium is 10 percent alcohol, 1 percent acetic acid, 1 percent yeast extract (Difco) and 2 mg. percent guanine. Evaporation of alcohol is compensated for by addition of 10 ml. of 50 percent alcohol at intervals when samples are withdrawn. Best results with the generator were obtained by packing it with wood fiber (excelsior). Shavings or no packing gave low yields of acetic acid and poor growth of bacteria.

With a good strain of bacteria and proper packing, a 10-fold increase, measured by turbidity of the medium, was obtained after about 15 days, while acetification took place at the rate of 1 percent acetic acid per day, with a maximum of 11.7 percent after 25 days.

It was possible to distinguish strains

Hours Saved Drudgery Eliminated

FULLERGRIPT BRUSH

Solves Conveyor Problem on Oyster Dredge

Wet sand and pieces of oyster shell can be very troublesome to conveyor systems, as H. C. Rowe & Co. of New Haven, Conn. found out. Two conveyor installations for unloading oysters had proved unsatisfactory because this material worked into the mechanism and caused frequent stops for repairs. Also, these "fines" as they are called, accumulated underneath the conveyor. About six hours were required every trip to clean them off.

W. H. Milroy & Co., New Haven engineers, were called in. On the conveyor system they designed, they mounted a semi-spiral Fullergript brush just below the pulley at the discharge end of the belt. This Fullergript brush flicks the "fines" into elevator buckets which carry the oysters overboard. The hand cleaning of "fines" from the belt is eliminated...saving hours of labor every trip.

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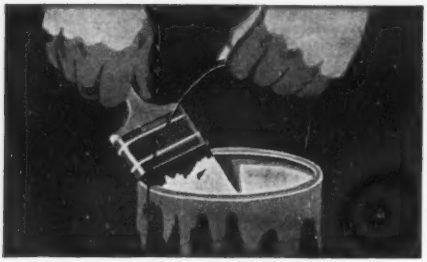

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by the use of the generator. A strain of *Acetobacter* isolated from beer by Tosie never exceeded 8 percent acetic acid, even after 45 days of growth; another strain isolated from a vinegar generator and known to be capable of oxidizing acetic acid, never exceeded 7 percent of acetic acid, even after a trial period of 55 days of growth.

Digest from "Pure Cultures of *Acetobacter* Under Conditions of Rapid Acetification," by R. Lambion and J. M. Wiame, *Revue des Fermentations et des Industries Alimentaires*, Vol. 6, No. 1, 25-27, Feb. 1951.

CONFECTIONERY

Gaging Moisture Absorption In the High-Sugar Foods

The equilibrium humidity (EH) of foods is highly important for selection of adequate packaging materials, or proper storage conditions, particularly confectionery. It is governed largely by the sugar content of a food and can be calculated from the equation:

$$EH = 100/(1 + 0.27N)$$

where N is the number of gram mols of sugar per 100g. of water in the food.

If the food contains commercial glucose with soluble non-sugar carbohydrates, the molecular weight of the solids can be taken at 334. In hard candies the sugar is in a highly supersaturated state, and the low EH figures obtained (20-30 percent) mean that moisture absorption will occur at very low relative humidities, and the candy will become sticky. With the aid of the formula the probable behavior of hard candies of different formulas can be predicted under varying conditions of atmospheric humidity.

Digest from "Equilibrium Humidity of Sugar Solutions," by R. W. Money and R. Born, *Journal of the Science of Food and Agriculture*, 180-185, April, 1951.

BREWING

High-Temperature Extraction Cuts Hop Substance Losses

Wort boiling, while necessary for clarification and development of color and flavor, also destroys or removes approximately 90 percent of the hop bitter substances that contribute to beer flavor and protect it during fermentation. Efforts to reduce this loss by separate extraction, percolation over the hops held in a basket-like arrangement above the boiling wort, or by pressure boiling of the kettle, have lead to reduced preservative values. Maximum preservative values are reached with about ¾ hr. boiling with hops free in the kettle.

Pressure boiling reduces the pH of wort by about 0.2 unit and increases the color, but is thought by some brewers to produce a superior beer, the higher temperature being held responsible for the flavor change. The Ullman process and its modifications, in which the wort is brought to temperatures above normal boiling by a steam-heated, plate-type, heat-exchanger outside the kettle, and pumped through the hops held in an external chamber, produces a wort of pH and color between those of pressure and atmospheric boiling. Excessive foaming and high rate of evaporation (up to 20 percent) produced when superheated worts are flashed into the kettle, can be reduced by using a regenerative section in the heat exchanger through which the superheated wort passes on its way back to the kettle. Boiling time is appreciably reduced by the use of the Ullman system.

Digest from "Wort Boiling," by F. E. B. Moritz and E. J. Jeffrey, *Brewers' Guild Journal*, 351-73, Aug. 1951.

FERMENTATION

Yeast From Sulfite Liquor

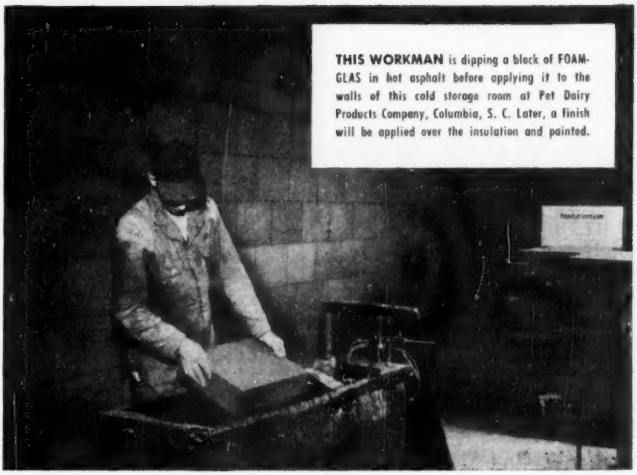
A unique and successful aeration wheel, developed for use in the frothy sulfite liquors employed in feed yeast manufacture in Germany, has been adopted by the only such plant in the US.

The sulfite liquor is steam-stripped of excess SO_2 in a tower packed with carbon Raschig rings and then flows to a fermenter where it is inoculated with *Torulopsis utilis*. Aqua ammonia, diammonium phosphate, and potassium chloride are supplied as additional nutrients, and fermentation is continuous at 98 F. Heat generated is dissipated by circulating the fermenting liquor through an external heat exchanger. Fermenters contain 20,000 gal. of liquor without air (45,000 gal. with air). Yeast is drawn off continuously into the first of 4 centrifugal separators.

Yeast cream from the first separator flows to the remaining three separators (being mixed with well water between each centrifuge to wash it), and emerges from the last into a yeast cream tank. It is dried on double drum, steam heated, atmospheric dryers. Effluent from the separators, its 5-day B.O.D. reduced by as much as 64.5 percent, flows into the river.

The plant operates with 3 men per 6-hr. shift on a 24-hr. basis with a small additional maintenance crew on the day shift. Operation has been very free from contamination.

Finished yeast, about 50 percent



THIS WORKMAN is dipping a block of FOAMGLAS in hot asphalt before applying it to the walls of this cold storage room at Pet Dairy Products Company, Columbia, S. C. Later, a finish will be applied over the insulation and painted.

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WITH FOAMGLAS . . . THE CELLULAR GLASS INSULATION!

FOAMGLAS has exceptional insulating properties. It won't pick up moisture in service when properly installed. It *retains* its insulating effectiveness through the years. This means that you save the cost of constant maintenance, repairs and eventual replacement of the insulating material.

It also means that you don't have to use cooling equipment with an overdesigned capacity. Since FOAMGLAS won't absorb moisture it offers you constant insulation value year in and year out. Even after long periods of operation, your equipment won't have to work any harder or longer than it did when first installed.

Those are the main reasons why so many users believe that FOAMGLAS is the most effective and economical insulating material on the market . . . for walls and ceilings, on roofs and under floors . . . on piping, valves and fittings . . . on coolers, accumulators and other processing equipment.

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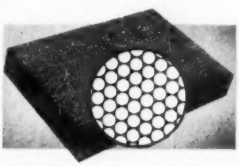

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protein, dry basis, compares favorably with other protein concentrates in amino acid and vitamin content. It is used largely in mixed feeds at the rate of 50 lb. per ton.

Digest from "Food Yeast From Sulfite Liquor," by A. J. Wiley, J. M. Holderby and L. P. Hughes, *Industrial and Engineering Chemisty*, 1702-11, Aug. 1951.

DAIRY

Gelatinous Cottage Cheese

Three species of bacteria, *A. metalcaligenes, P. viscosa and P. fragi,* have been shown to be responsible for a gelatinous or slimy curd defect in cottage cheese. Limited control of the defect may be attained by lowering the pH of the cheese, but exclusion of the causative bacteria is the only effective means of preventing it.

Microscopic examinations of defective curds revealed large numbers of gram-negative rods in addition to the normal lactic streptococcus flora. A study of morphological and cultural characteristics of bacteria revealed three capable of producing the defects, and inoculation of experimental lots of cheese with these organisms verified their ability.

Observation that higher pH values favored growth of the spoilage organisms in cheese curd, led to trials at pH levels of 4.6, 4.8, 5.0, 5.2 and 5.4. Results indicate that a pH below 5.0 will control the defect. Tests with salt indicated that, at pH 5.2, levels required to prevent growth of the 3 spoilage organisms were too high to be practical.

It was concluded that the only certain method of preventing sporadic outbreaks is to eliminate the causative organisms by proper pasteurization of milk and cream, chlorination of wash water and thorough cleaning and sanitization of equipment.

Digest from "Bacteria Associated With a Gelatinous or Slimy Curd Defect of Cottage Cheese," by R. B. Parker, V. N. Smith and P. R. Elliker, *Journal of Dairy Science*, 887-93, Sept. 1951.

Vitamin A Potency of Butter Not Cut by Neutralization

Neither acidity of the cream at the time of churning, nor the kind or type of commercial neutralizer used to standardize acidity, have any appreciable effect on the carotene and vitamin A content of the resulting butter or butter held in cold storage.

These conclusions are based on results of experimental churnings of high-quality sweet cream, the same cream after it had been allowed to sour and the acid reduced (with both

(*Turn to page* 175)

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soda- and lime-type neutralizers), and low-grade sour cream that had been neutralized.

All samples of butter were analyzed for carotene and vitamin A when fresh. The sweet cream butter samples were likewise analyzed after 60 days at 40 F., and 180 days at 0 F. Sour cream samples were also analyzed after 30 days at 40 F., and 75 days at 0 F.

No appreciable differences were found between the carotene and vitamin A contents of the fresh butters, and the same butters held at 40 F. and stored at 0 F.

Digest from "The Vitamin A Potency of Fresh and of Stored Butter Made From Sweet and From Neutralized Sour Cream," by J. L. Brence and J. A. Nelson, *Journal of Dairy Science*, 949-52, Oct. 1951.

MISCELLANEOUS

Algae Grown Continuously In Laboratory System

In a search for intensive and rapid methods of producing food and feedstuffs from simple and non-edible raw materials, the Stanford Research Institute has investigated large scale growth of *Chlorella pyrenoides*, a single-celled green alga long used for studies of photosynthesis.

Chlorella requires CO_2, water, light, minerals, and micro-nutrients for its growth, and when separated from its growth medium and dried will contain about 50 percent protein. With reduced nitrogen, cells containing up to 85 percent lipides have been produced.

A continuous laboratory system of growing *Chlorella* was devised for use in both artificial light (three 100-w. fluorescent lamps) or sunlight. A temperature of 20-24 C. and aeration at the rate of 3 cu. ft. per hr. with 5 percent CO_2 gave maximum yields in the apparatus in which the growth chamber was a glass column 4-in. dia. x 6 ft. high. In sunlight, a maximum intensity of light is reached beyond which photosynthesis does not increase. Turbulence of the medium is necessary and, for maximum production, the population density of the algae should be maintained at 0.36 g. of dry substance per c.l. of medium.

The *Chlorella* culture must be maintained pure, since foreign organisms seem to inhibit normal growth. Large scale production, using sunlight might be geographically limited to certain regions on the earth's surface, but would require no unusual engineering features. In sunlight, yields of 0.279 g. per day were obtained, with the figure going up to 0.351 g. on clear days.

Digest from "Chemical Engineering Problems in Large Scale Culture of Algae," by Paul M. Cook, *Industrial and Engineering Chemistry*, 2385-89, Oct. 1951.

Designed to handle loads of 500, 1000, or 2000 lbs., the Shepard Niles Lift-About Jr. electric hoist actually exceeds, in performance, that which customarily is expected from these lighter service hoists. And requires less maintenance in doing so.

Two factors are responsible for such outstanding performance: one is a sound engineering background that comes from years of specialized experience. This is apparent in the design and construction of the hoist itself. The other is the Shepard Niles policy of making certain that the hoist you buy is the *right* hoist for *your* service. It is a policy that protects against buying a hoist that is too light for severe service. By the same token, it prevents investing more than necessary when lighter service *is* indicated.

If you would like help with your handling problems, write us. A Shepard Niles specialist will be glad to place our years' of material handling experience at your service.

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Makes and sells all three lifting tools for airborne shop loads

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Avoid PRODUCT-DAMAGE Losses with the new DUDLEY Can Unscrambler!

Completely automatic, the new Dudley "roll-off" can unscrambler eliminates the need for labor, feeds cans to labelers in a steady, fast stream . . . *gently.*

Operates on all cans, 6 oz. to No. 2½ tins. Simple side mounted lever adjusts in two minutes.

Model 400 Dudley Can Unscrambler has 4 lanes; these lanes can be varied to exactly match capacity requirements of any large run.

Model 100 has single lane, for use on smaller capacity runs. Cooker capacity is doubled* with this unit alone, because canner handles jumbled cans in double layers.

For complete Dudley system, Dudley basket dumps, spreading table and elevators are available.

*ON THE BASIS OF RATED CAPACITIES AND PERFORMANCE.

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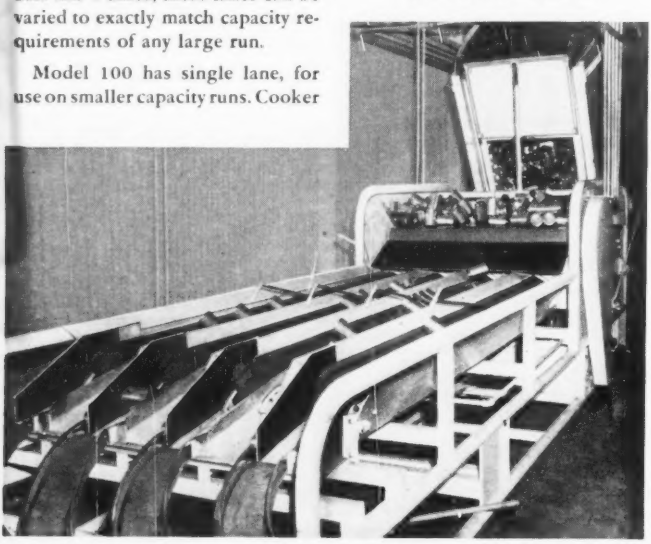

Photo Showing Dudley Model 400 Can Unscrambler with Dudley Basket Dumper

DUDLEY Machinery Corporation

Mountain View, California

Farm-to-Family Quality

—Continued from page 96

onto which the belt discharges accelerates the movement of the chips so that a one-chip layer cascades into the filling heads. Made of stainless, 32 of the latter are attached to the outside of a rotating cylinder of approximately 8 ft. diameter. They are detachable for cleaning in eight assemblies of four heads each.

Although the volume passing between the feed roll and the belt was uniform, speed and accuracy could not be controlled by this method alone. It was found necessary to closely regulate the rate of the vibrator, the speeds of the belt and the roll, and also the rotating speed of the drum to which the filling heads are attached. It was only after variable speed drives were added and minor adjustments made that a speed of 120 accurate fills per minute was obtained.

However, when the speed of filling was tripled, another serious problem was faced—this time in the bag-feeding operation, which could not be mechanized and therefore remains a hand job.

Here are details of the operation: Extending down from each filling head are two prongs, one stationary, the other pivoted at the head. Spread apart, these prongs hold the bags open and in place during filling. A filled bag is discharged when a machine-tripped lever brings the prongs together and simultaneously releases the swing-plate support under the bag. An operator then slips an empty bag over the closed prongs and with a follow-through motion throws the lever that spreads the prongs to open the bag.

"Knack" Required

At first, the 120-a-minute speed was too fast for such hand operations. However, that hurdle was finally cleared—the answer being ambidextrous girls with the most agile fingers. For to meet the filling rate, bag feeding with both hands was necessary.

"Chuting" bags onto spouts requires a "knack." Those girls who, with the aid of method instructions, increased speed sufficiently were permanently assigned to chuting—a choice berth. With the aid of specially designed two-compartment empty-bag holders, trained operators can now maintain the 120 speed for sustained periods. And they prefer the fast, dexterity-demanding operation to the more monotonous routines.

Filling machines were designed specifically to fill chips into bags. However, plans called for inclusion

of output of vacuum-packed shoestring potatoes. In a plant already expansion-congested, it was thus necessary to adapt the units to filling cans as well as bags. Here is how it was done:

Swing plates support bags during filling, riding a cam which permits plates to drop at the bag-discharge point. Since some bags are as much as 14 in. high, clearance between receiving conveyor and swing-plate supports was sufficient to allow a portable chain plate conveyor to be placed above the bag conveyor, with ample margin below the swing plates. Now, filled cans drop onto this conveyor without spilling and are then transported to the closing machine. The latter is located so as not to interfere when the bag-packing line is operating.

With use of the variable speed controls, the volume of fill can be set to the rate requirements of the closing machine.

Designs Bag Conveyor and Aligner

Transporting bags away from the filler presented still another problem. Bags would not stand upright on the conventional conveyor in use. Not only did contents of toppled bags spill, but also the labor required to right them in positon to feed into the heat sealer was excessive. A plant-built conveyor and automatic bag aligner removed the objectionable features of the former conveyor system.

Made by adding a series of recessed plates, attached to a roller chain, the new conveyor functions as a traveling trough. Plates, formed V-shaped, have a 6-in. spread at the top, with tapering to 1½-in. at the vortex.

Though the bags thus traveled upright on the improved conveyor, an accident hazard was inherent in the design. When the conveyor rounds the sprockets at its ends, the trough-forming plates open and close like shears. Safety was again assured, however, when conveyor ends were encased in metal sheathing.

And now for the improvised heat-sealer feed, which not only made sealing speed-up possible, but also reduced the labor of hand feeding. Here a device closes the top edges of the bags and lines them up to feed into the sealer at the required speed. Guides are coil-spring wire-belts, running on pulleys. The assembly is synchronized in speed with the trough conveyor. Bags extend 1-2 in. above the guide coils, which converge in the direction of travel, thus gripping the bag top firmly to insure a positive feed to the heat sealer.

However, resulting speed-up of feed was 3 to 1 that of the normal 40-per-minute rate of the heat sealer. To step-up tempo of the closing

Here's what
IN-PLANT CHLORINATION can do

"Member of National Canners Association"

BAKER CANNING COMPANY

Theresa, Wisconsin

April 4, 1949

PACKERS OF NUMBER 10 TINS
Wisconsin Quality
. . Peas . .
Whole Kernel Corn

Address all Communications to Theresa, Wisconsin

Wallace & Tiernan Co., Inc.
Newark 1, New Jersey

Gentlemen:

We have been using In-Plant Chlorination for a few years, and feel that this piece of equipment is just as important in a canning factory as any other piece of equipment used in the processing of canned foods.

The first year we installed In-Plant Chlorination we had chemists make bacteria counts, and checks at approximately fourteen points throughout the plant, such as picking table belts, flume systems, washers, blanchers, fillers, closing machines etc. In making these tests we did not use In-Plant Chlorination for one week, and the next week we used In-Plant Chlorination in order to make comparisons as to bacteria count.

The reduction in bacteria count, between the two operations is almost unbelieveable. We found that by using this equipment properly, and increasing the dosage at clean-up time, we eliminated bacteria at many of the check points. One cannot, however, install In-Plant Chlorination and forget about a good housekeeping job. This would be an error, indeed.

However, by having In-Plant Chlorination, and doing a good job of house-cleaning, one can eliminate the building up of bacteria in most any piece of equipment. We do find that by using In-Plant Chlorination the clean-up time necessary at clean-up periods is practically cut in half.

You may use this letter in part or in full - for any purpose you care to.

Yours very truly,

BAKER CANNING COMPANY

By

RDB:eal

In-Plant Chlorination, engineered by Wallace & Tiernan, can help your plant, too. Bacterial counts are reduced, odors controlled, and on-the-line time for processing equipment increased when you use this proven method.

Call your nearest W & T Representative now for complete information.

Other services by Wallace & Tiernan Associated Companies include Merchen Feeders for precision blending BY WEIGHT; Richmond Sifters for all separating problems involving powdered or ground materials; and Richmond Permaflux Magnets for the complete elimination of any ferro-metallic contamination of your food line.

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DUST CONTROL—MATERIAL HANDLING

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In a recent modernization program at Kellogg's large Battle Creek, Michigan plant the DAY Company was selected to engineer, manufacture and install dust control, material handling and storage equipment. The total project included the following:

DUST CONTROL FOR CORN AND WHEAT CLEANING: A turn-key job which included DAY Type "AC" Dust Filters with proven dust collection efficiencies of 99.99% and better; the widely accepted DAY Dual Clone Dust Separators which assure maximum centrifugal dust separation, and DAY Exhausters designed for highest efficiency in dust control applications.

MATERIAL HANDLING: DAY self-cleaning Pneumatic Conveyor system was installed for fast, dust-free grits conveying.

CEREAL STORAGE: For use in the storage of Rice Krispies, DAY fire and vermin proof, non-bridging bulk storage bins were supplied. These bins are furnished in either heavy, galvanized black iron or stainless steel.

LEADING COMPANIES RELY ON DAY

Records show that most of the nation's leading millers and many food processors depend upon DAY. According to a national survey, DAY dust control equipment is the predominant choice, with DAY leading its nearest competitor in this field of dust control by a margin of 10 to 1.

DAY EXPERIENCE CAN SOLVE YOUR DUST CONTROL PROBLEMS

This achievement record, plus the experience gained by The DAY Company in engineering, manufacturing and installing dust control systems for food processing plants since 1881 is of great importance to you. It means that when you call upon DAY, you benefit from their 70 years' experience. No other dust control manufacturer can even approach DAY's accumulated knowledge in this specialized field. Regardless of your dust problem, DAY can provide an effective and economical solution. For engineering assistance and cost estimates, Write-to-DAY!

DAY SINCE 1881

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operation, standard heating units were replaced by much larger elements. Then the gear ratio was adjusted to the 120 rate. The preheater is now set at approximately 450 deg. F., with heating rolls at 300 deg. F. for average thermoplastic bags. This satisfactorily seals at the increased rate. When, as sometimes is the case, time-temperature must be varied from the average setting, the necessary adjustments are easily made.

3—DISTRIBUTION CONTROL

No matter how high the quality of finished product, chips with an oil content of 35-40 percent will become stale and rancid if they remain too long on the dealers' shelves. Loss of consumer acceptance will follow after purchase of off-quality products. Control, therefore, must be exercised over the product until it leaves the retailer.

Since Red Dot's distribution is from its branches, constant checking of product quality is conducted by driver salesmen who maintain outlet supply within shelf-life turnover. Any packages that are beyond their freshness-deadline are removed from stock. Only by code dating packages is this control of product after shipment made possible.

An electronically-operated counter-coder was selected and then was made highly efficient by changes in the machine's original operations. Counts are register-recorded, and coding is by perforations through the heat-sealed closure. The machine was originally designed to operate when an electric-eye beam was interrupted by the entering edge of the package seal. But operation proved inefficient and coding and counting results undependable—until, after trial and error methods, machine-sequence was reversed. Now the machine punches the code and records the count as the beam contact is restored after the package seal has cleared it.

Laboratory Function

Overall control of quality starts with test-plot determinations of planting, fertilizing, spraying, and other farming procedures. Results of tests are laboratory determined. The laboratory's control endpoint is the package—selected for trial through laboratory determination, adopted when laboratory testing (following a shelf life period in retail outlets) proves its worth.

Two major functions of Red Dot's laboratory control are to maintain quality at highest possible level and to locate the problems for research investigation.

End (Resume reading on page 97)

Get a dependable DODGE "Job-Rated" TRUCK ...and watch hauling costs go down!

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There's famous Dodge *dependability*, too—final assurance of lower upkeep and operating costs, year after year.

But why not see for yourself? Pay a visit to your nearby Dodge dealer—real soon!

How Dodge trucks are *"Job-Rated"* for hauling foods

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Every unit from engine to rear axle is *"Job-Rated"*—factory-engineered to haul a specific load over the roads you travel and at the speeds you require.

Every unit that SUPPORTS the load—frame, axles, springs, wheels, tires, and others—is engineered right to provide the strength and capacity needed.

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Questions & Answers

THIS MONTH'S PROBLEM

Question—I've been attempting to salt peanuts in the shell, but have been unable to prepare a satisfactory product. Can you give me details on the procedure for salting peanuts in the shell?

Answer to October Problem

The Question Was—In the determination of the square feet of heating surface necessary in a modern, high-vacuum, falling-film type evaporator, what heat-transfer rates can be figured on to concentrate fruit juices in the manufacture of frozen juice concentrates?

Answer—Heat-transfer rates will vary with the type of juice, pulp, sugar solids, and pectin contents. For raw juice, the heat-transfer rate should be in the range of 150-200 Btu sq. ft. x hr. x deg. F. At a concentration of 50 percent solids, the heat-transfer rate should drop off to 75-100 Btu. sq. ft. x hr. x deg. F.

For example, orange juice at a concentration of 55 percent solids would have a falling-film, heat-transfer rate of about 100 Btu. sq. ft. x hr. x deg. F. Temperature in the evaporator would be about 75 deg. F. and the pulp content (based on reconstituted juice) approximately 8 percent. Pulp content is measured by the laboratory centrifuge sedimentation procedure.

Wants to Get Phytates

Question—Since reading the article on treating cherries with phytates to prevent discoloration (p. 91, March FOOD INDUSTRIES*) we have contacted a number of chemical houses in an effort to obtain these chemicals. However, we have been told that the demand for calcium phytate in biological-chemical processes is so great that it will be at least two years before it is available in sufficient quantity for other industrial purposes. Have you any further information on the availability of phytates?*

Answer—As you were advised, calcium phytate, sodium phytate, and phytic acid are being extensively used by the pharmaceutical industry. And the result is that these chemicals are in extremely limited supply at the present time.

However, we are of the understanding that sufficient quantities are available for experimental purposes, particularly on products such as fruits. Why not try to obtain them on this basis?

Why Almonds Discolor

Question—Recently, we started to produce blanched almonds for domestic and foreign sales. But much to our dismay, these nuts, instead of retaining their original ivory-white color, soon turned yellow or black. And because of this condition, we've had to hold back on the shipment of some of our production. Is there any effective method of preventing this discoloration?—Ditta G. Matarrese, Rome, Italy.

Answer—Undoubtedly, your difficulty is improper blanching, with the result that the moisture content of the almonds is too high. You can avoid the discoloration only by blanching the almonds to a low moisture level—not above a 2-3 percent range.

We suggest that you conduct the following experiment to determine how far you should go in blanching your almonds:

Load the nuts in shallow, perforated wire baskets. Place the baskets in an oven with circulating hot air (180 deg. F.). Remove the baskets from the oven after different blanching periods. Then analyze the different lots of blanched almonds for moisture content, store them, and examine the nuts periodically for evidence of discoloration.

Detecting Foreign Matter

Question—How can we detect foreign matter—stones, glass, metal, and wood—in our candy bars?

Answer—A thorough visual inspection of packaged candy bars can be made with the aid of a fluorescent X-ray machine. X-rays passing through a candy bar strike a fluorescent screen

How Would *You* Do It?

Readers are invited to submit to FOOD ENGINEERING answers to questions in this department, especially to "This Month's Problem." Selected answers will be published, with credit (unless you specify otherwise). We pay space rates.

What Is *Your* Problem?

Subscribers also are invited to send in food engineering questions. We undertake to provide answers, free, to the best of our ability. We do not undertake costly investigations. Give full information and your name. Your identity will not be disclosed.

Write to Questions & Answers Editor, FOOD ENGINEERING, 330 W. 42nd St., New York 36, N. Y.

and produce light. The intensity of the light is dependent upon the thickness and density of the bar.

Since most foreign matter is more resistant to the passage of the X-rays, than the candy bar—or, for that matter, any other food—it will be outlined on the screen as a dark shadow against a lighter image produced by the candy bar.

For the specific purpose of spotting stray metal (as differentiated from non-metallic foreign matter), another machine may be used—an electronic detector. This may be mounted over a conveyor feeding candy to packing station.

Imitation Vanilla Formula

Question—We wish to prepare imitation vanilla flavor (non-alcoholic) to be bottled in small sizes for the retail trade. Would you cite a formula using ethyl vanillin, vanillin, coumarin, propylene glycol, and water colored with caramel?

Answer—Actually, there are two principal steps in the manufacture of a non-alcoholic imitation vanilla flavor —preparing the concentrated flavor, and then making the diluted product.

To produce the concentrate, slowly add 7.25 lb. of ethyl vanillin, 48.90 lb. of vanillin, and 2.00 lb. of coumarin to 15 gal. of propylene glycol, preferably in a small glass-lined tank. As the crystalline ingredients are thoroughly mixed in the solvent, gradually heat the liquid to 110-120 deg. F. Continue stirring until all ingredients are dissolved.

Now to making the actual imitation flavor itself: Into a glass-lined tank equipped with a propeller, or similar type agitator, add 40 oz. of caramel color and 30 gal. of water. Mix until the color dissolves. Finally, slowly add 1 gal. of the concentrated flavor while stirring. And, with additional water, bring the batch up to the 40-gal. mark. Now fill the flavor into bottles without filtering.

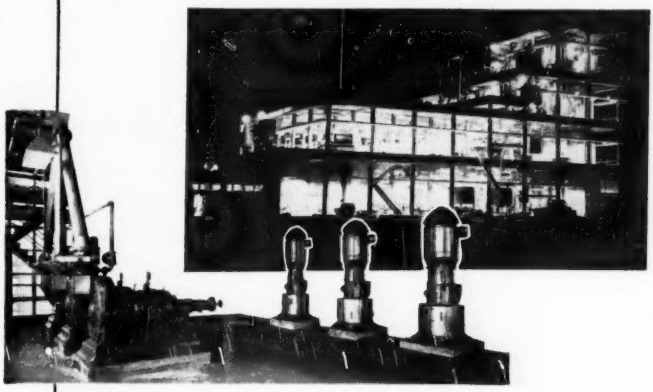
A word of caution: Don't use less of the solvent, propylene glycol, than the formula specifies, since crystallization of the flavor ingredients will occur in bottles at temperatures below 65 deg. F.

Another thing! You will note that a light red coloration takes place in the preparation of the concentrate. This is due to a complex organic reaction that takes place between vanillin and propylene glycol. Intensity of this discoloration is influenced by the amount of these ingredients employed. However, this discoloration is only observed in the concentrate, and it does not affect, in any way, the color of the diluted product. Dilution and caramel coloring mask it.

New CORN PRODUCTS PLANT MODERNIZES STARCH and SUGAR PRODUCTION

The "Bluebonnet" plant at Corpus Christi, Tex., *made headlines*—not only because of its unique wall-less construction. Of even greater interest to the process industry are the much improved, continuous methods used to transform Milo Maize into starch and sugar. The engineers of Corn Products Refining Company broke with tradition—sought and found a *better way* to make starch!

Here, the old conventional stone-type buhr mill was replaced with modern-day *degerminating mills, disintegrators,* and *repulpers* . . . all specially equipped for starch processing.



At Corpus Christi, six Sprout-Waldron 36" single disc degerminating mills handle the full plant load of incoming grain, freeing the germ from the kernel without crushing it. After separation, three disintegrators and two SW 36" double disc repulpers take over and together do a job that formerly required six buhr mills, moisture expellers, and a three-stage coarse fiber washing station to get the same results.

Engineers of the "Bluebonnet" plant point out that the use of Sprout-Waldron repulpers, in combination with disintegrators, improves the recovery of starch, decreases maintenance costs, and requires considerably less floor space than previous methods.

Why not bring your size reduction problems to Sprout-Waldron? Our broad experience may be helpful to you, too! Write Sprout, Waldron & Co., Inc., 35 Waldron St., Muncy, Pa.

LOOK TO SPROUT-WALDRON for BETTER PROCESSING EQUIPMENT

Sprout-Waldron
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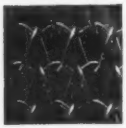
177

No pun intended! This Cambridge woven wire conveyor belt carries cleaned fish through a wash tank to remove scales and scrap so the fish will present an attractive appearance on retail counters.

Cleaned fish are dropped from cleaning table A, onto the surface of conveyor belt B, passing through wash tank C. At the end of the tank hold-down angles change the movement of the belt to a 60° incline.

Stainless steel wire, used in weaving this belt, resists corrosive attack of salt water in the wash tank, can be cleaned without damage by steam or by detergents added to the salt water.



In this application, BALANCED BELTING provides low original cost and controllable belt travel. ½" openings in belt weave permit free drainage of wash water and scraps. Angle cleats across the belt hold the fish during the upward movement.

Whatever food you're processing, there's no need to fish around when you want experienced advice on any problem of combining movement with processing. Call in your Cambridge field engineer for his recommendation on the proper . . .

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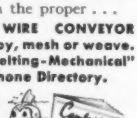

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Useful New Books & Government Publications

Tastes and Smells

THE CHEMICAL SENSES. 2ND EDITION. *By R. W. Moncrieff. Published by Leonard Hill Ltd., 17 Stratford Place, W. 1, London,* 1951. 538 *pages; 6¼ x 9¼ in., cloth. Price* 21*s.*

Biochemical and organic chemical aspects of human reactions to tastes and odors are presented in this technical work. As flavor panels gain wider acceptance, the mechanics of how and why a person reacts to foods is of growing importance.

Many formulas are pictured to document the text. And several general chapters on gustation, classification of odors, taste and constitution, and flavor and food—thoroughly describe how the chemical senses control the body.

A complete glossary and bibliography accompanies the book.

Papaya Enzyme Reviewed

PAPAIN. *Edited by R. W. Minor and B. J. Henegan. Published by the New York Academy of Sciences, Volume 54, Art. 2., 2 E. 63rd St., New York 21, N. Y.,* 1951. 153 *pages; 6¼ x 9¼ in., cloth. Price* $3.

Due to recent renewed interest in the enzymatic extract of papain from green papaya, the publication of this monograph is very timely.

Papain is being used to tenderize meats and to treat beer. And it is also employed in the manufacture of chewing gum and other foods. Consequently, the reviews and correlations presented on methods for measuring the proteolytic activity of papain will serve to bring the industry up-to-date on the latest analytical technics.

Several chapters are devoted to procedures for preparing the enzyme from the papaya and the resultant activity changes that occur. The effects of temperature and chemical treatment on papain are discussed.

Microorganism Round-Up

ANNUAL REVIEW OF MICROBIOLOGY, VOL. 5. *Edited by Charles E. Clifton, Sidney Raffel, and H. Albert Barker. Published by Annual Reviews, Inc., Stanford, Calif.,* 1951. 379 *pages; 6¼ x 9¼ in., cloth. Price* $6.

More than 20 scientists have contributed papers to the editors of this yearly volume that covers advances in microbiology.

Morphology, cytology, metabolism, and nutrition of various bacteria, fungi, and protozoa are discussed in the 19 chapters. Liberal literature-reference listings follow each chapter.

Of particular concern to food people at this time are the chapters on algae and antibiotics. With recent pilot-plant activity in this country pointed toward recovery of edible foods from algae, Jack Myers' chapter entitled "Physiology of the Algae" is timely.

Also notable is the contribution by George Brownlee, titled "Antibiotics, With Particular Reference to Mode of Action." This contains explanations of several theories on how these highly-publicized agents operate—pertinent to researchers working on food sterilization with antibiotics.

Super Wine-Bibliography

A CHECK LIST OF BOOKS AND PAMPHLETS ON GRAPES AND WINE. *By Maynard A. Amerine and Louise B. Wheeler. Published by University of California Press, Berkeley and Los Angeles, Calif.,* 1951. 240 *pages; 6 x 9¼ in., cloth. Price* $5.

Tabulated here is all available book and pamphlet material pertaining to grapes and wines published world-wide during the period 1938-1948. Because exchange of information between our country and other large grape processing areas has been limited in the past—especially during the war—this compilation of references is most welcome.

Primary listings are by author or source, followed by subject, country and state of publication, with editor's and translator's cross-indices.

Offering a key to the vast European store of technical know-how on vitaculture (grape growing) and enology (wine making) this volume should be particularly valuable to those doing research and analytical work.

Productivity Team Reports

MEAT PACKAGING AND PROCESSING. *By British Productivity Team representing the Meat Packaging and Processing Industry. Published by Anglo-American Council on Productivity, 2 Park Ave., New York, N. Y.,* 1951. 72 *pages; 7¼ x 9¾ in., paper. Price* 4*s.*

"How others look at us" can best describe this short but concise treatise on the American meat industry.

Written as a report to British packers, this volume highlights our production methods, engineering technics, plant set-ups—both labor and building, and research and quality control pro-

cedures. The report is liberally documented with pictures, equipment diagrams and layouts, and record forms used in the U. S.

RIGID BOXES AND CARTONS. *By British Productivity Team representing the Rigid Boxes and Cartons Industry. Published by Anglo-American Council on Productivity, 2 Park Ave., New York, N. Y.*, 1951. 38 *pages; 7¼ x 9¾ in., paper. Price* 25*s.*

Another report in the series on how the British look at a specific phase of our industry is offered here.

Though not quite as detailed as the other numbers in the series, this work offers interesting facts about our folding carton and rigid box industry. In addition to the standard descriptions of production and labor relations, there are a number of graphs indicating average daily output per worker on various packaging operations.

Government Publications

CURING OF FISHERY PRODUCTS. *By Norman D. Jarvis. Fish & Wildlife Service, Research Report* 18. *Price* 60*c*. Here are described, with diagrams and photos, fish curing methods investigated. Furnishing a reference handbook on problems and methods, this publication includes information from recent technical studies of the principles on which fish curing is based. Discussed, also, are improvements in methods and equipment, with the standard methods described.

These recently issued documents are available, at the prices indicated, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. When no price is indicated, the pamphlet is free and should be ordered directly from the Bureau responsible for its issue.

USE OF FRUITS BY CHICAGO BAKERS. *U. S. Department of Agriculture, Agriculture Information Bulletin No.* 42. *Price* 50*c*. This study of the preference of fruits used by bakers should be of interest to fruit growers, processors, and distributors.

DAIRY STATISTICS AND RELATED SERIES. *U. S. Department of Agriculture, Statistical Bulletin No.* 100. *Price* 50*c*. This is an effort to give, under one cover, selected key dairy series in a form more convenient for all users.

STOCKPILE REPORT TO THE CONGRESS. *Munitions Board, July* 23, 1951. This is a report on stockpiling and stockpile supporting activities during January-June 1951. Processed.

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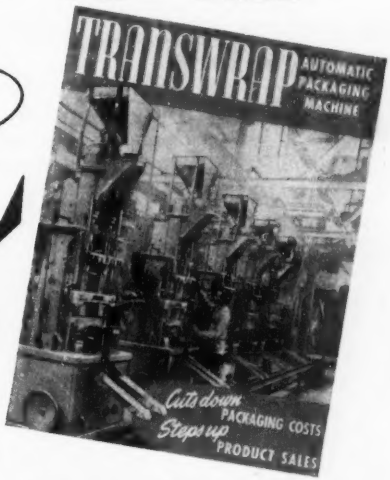

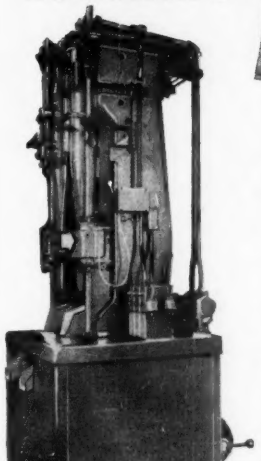

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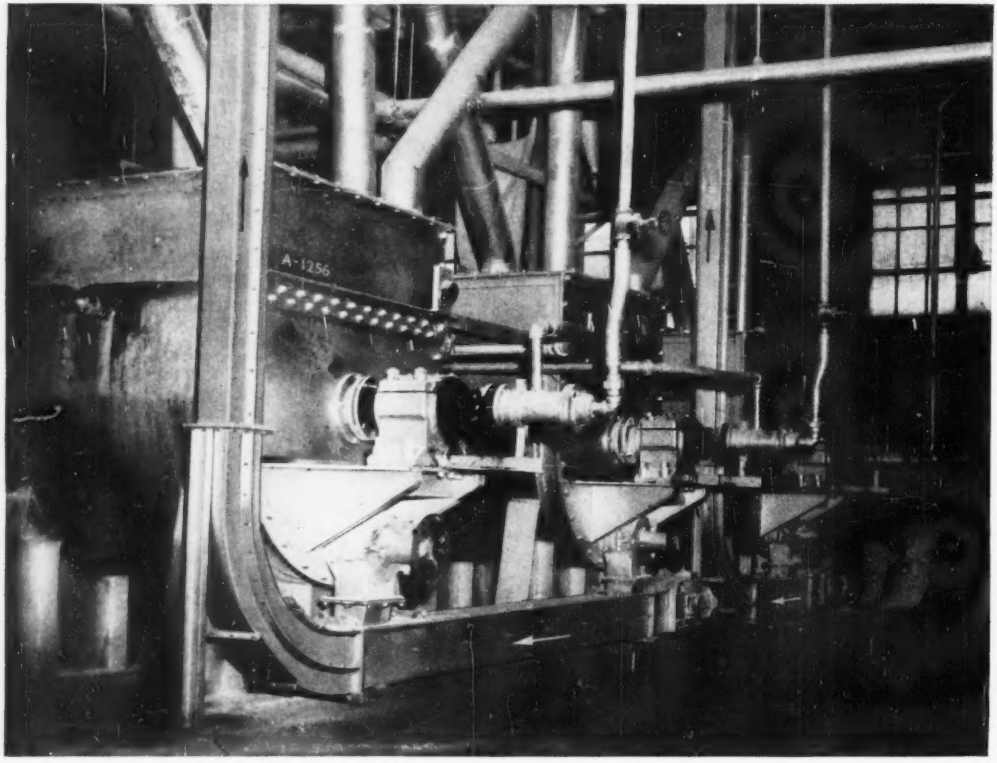

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KEEPING UP WITH THE FIELD

Technical News • Washington Highlights • Economic Trends • Labor Developments

Set Pricing Deadline

The Office of Price Stabilization has ordered the General Manufacturers' regulation—CPR-22—to become mandatory on Dec. 19.

Also, a supplement has been issued providing for optional adjustment of ceilings under the Capehart Amendment recently passed by Congress.

This supplement will allow chemical and food manufacturers to calculate adjustments under the Amendment—providing for inclusion of costs in addition to those mentioned in the original CPR-22.

Principal differences between the original manufacturing regulation and the newly issued supplement include:

(1) Under CPR-22, any of four calendar quarters between July 1, 1949 and June 30, 1950, can be used as a base period for finding pre-Korean prices and costs. Under the supplement, manufacturers can use only certain 1950 periods—either Jan. 1 to June 24, 1950, or the two 1950 quarters provided in CPR-22.

(2) CPR-22 permits cost increases to be figured from the end of the base quarter selected by the manufacturers. The supplement provides for three alternative methods: (a) Increases in cost from the date on which the manufacturer received the highest price between Jan. 1 and June 24, 1950, or (b) June 24, 1950 for all his commodities, or (c) from the last day of the two 1950 base period quarters of the regulations.

(3) The manufacturing regulation provides increases in labor costs up to Mar. 15, 1951, and increases in most materials to either Dec. 31, 1950, or Mar. 15, 1951, depending upon the material involved. The supplement makes July 26, 1951 the cut-off date for both labor and materials.

(4) CPR-22 takes into account only changes in the cost of factory labor and manufacturing materials, while the supplement allows inclusion of all cost increases, including rises in overhead costs, except those considered "unreasonable or excessive."

Atomic Go-Ahead for Foods

The Atomic Energy Commission's program to "civilize the atom" has taken another stride forward.

Permission has recently been granted to several research centers to start work on the sterilization of foods using radioactive atomic waste materials. Along with the Brookhaven Laboratories, Long Island, N. Y., the following schools will be active on the project: Columbia U., M.I.T., and the U. of Michigan.

Wage Escalators Criticized

The Bakery & Confectionery Workers' Union doesn't like wage escalator clauses which tie wage adjustments to changes in the cost of living. But it will "tolerate" them during the emergency period.

Substance of an article by the union's president, W. F. Schnitzler, states that the automatic escalator clause take wages out of collective bargaining and reduces the worker opportunity to improve real wages.

Food-Law Change Seen

Some amendment next spring in the Food, Drug, & Cosmetic Act is confidently expected in Washington. Two food points facing legislative consideration, perhaps action, were defined by Commissioner Charles W. Crawford in a recent address before the American Bar Assn.:

1. Amendment to the law to prevent the "use of inadequately tested substances in food". This would call for a "new chemicals section".

2. Elimination of immunity from regulation of inferior products—as in the instance of jam being "labeled as an 'imitation'".

Almost equally significant was a later address by Mr. Crawford before the American Institute of Baking. Here, he defined a new standard of bakers' responsibility to the public, then portrayed the rewards for such effort.

Many food engineers incline toward acceptance of the ideas *in principle*. But it is obviously going to be difficult to get comparable agreement on phrasing of amendments. Those who know Washington say that coordinated and cooperative action of food, drug, cosmetic, and chemical industries is important for wise action on *all* the new ideas to be considered.

Sets Firmer Metal Rules

In line with across-the-board cutbacks on non-military structural metals, the U. S. Department of Agriculture has tightened its rules for approving construction applications prior to passing them on to the National Production Authority.

All applications will be reviewed under three categories of essentiality:

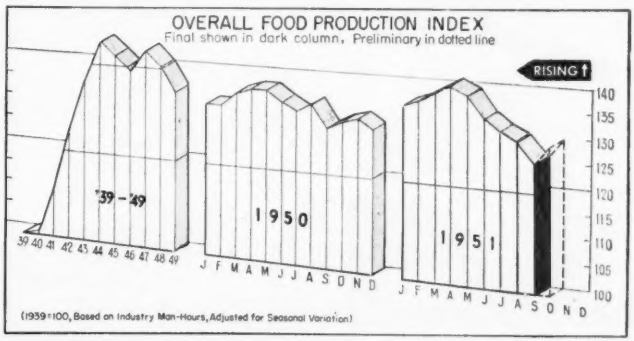
1. Non-deferrable projects basically important to the nation's food program, where existing facilities are clearly inadequate to meet food requirements.

2. Projects involving public health, safety, and welfare, where immediate remodeling or replacement of facilities has been ordered by government officials in order to safeguard public interests.

3. Projects involving severe personal hardship—to be reviewed only after needs (1) and (2) are met.

Food firms requiring construction materials in the second quarter of 1952 are urged to file applications before Jan. 1.

The overall picture for canning, packaging, and bakery equipment makers is still spotty, however. With a tight metals-squeeze coming up, the NPA is urging them to convert to military production.



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SATISFACTION PATTERSON MACHINERY

Packaging Forum Largest

The Thirteenth Forum of the Packaging Institute, recently held in New York City, registered over 1,000 persons, the largest attendance ever recorded by the Institute for its annual convention.

At the business sessions, Mr. Robert S. de Couch of General Foods was elected president and also to the board of directors. Other directors-elect include Messrs. E. F. Dival, Corn Products Refining Co.; G. Norwood Fisher, Kraft Foods Co.; H. Lyle Greene, Peters Machinery Co.; F. S. Leinbach, Riegel Paper Corp.; and H. A. Miller, Burt Machine Co.

Versus Oil Staining

Two independent groups are making headway in their studies on eliminating oil or grease stains from fiber food packages, according to reports at the recent Packaging Institute Forum in New York City.

Routine fat extraction analyses are now generally regarded as useless in checking for a food's free-oil content —the real criterion of whether a product will stain its package.

Details of a new quantitative method now used at M.I.T. for the determination of free-oils include: (1) Storing given weights of foods under controlled conditions of temperature and humidity in standard, stapled, test boxes made from high-grade photographic blotting paper; (2) checking the amount of oil transferred from food to box, after 48 hr., by petroleum ether extraction; and (3) expressing the results as mg. of fat per g. of food.

Recommended standard conditions are: Temperature, 100 deg. F.; relative humidity, 30 and 90 percent; and ether extraction time, 3 hr.

Amount of free oil absorbed by the test box was twice as much at 90 percent than at 30 percent R.H. Tests made with mixtures of varying fat content indicated a logarithmic relationship between free-fat and total-fat contents.

In work being conducted in the research department of the American Can Co., it has been found that the size of an oil-stained area on a fiber package can not be regarded as a measure of the free-oil in a food—due to the fact that different oils possess differing ability to spread. Coconut oil, for example, has the greatest tendency to migrate.

The staining ability appears to be a direct function of weight factor (depth of food) times spreading factor.

Streamlined Standards

Simplified procedures in the setting of food standards may soon be a reality, according to Commissioner C. W. Crawford of the F&DA.

Speaking before the American Bar Assn. in New York, Mr. Crawford outlined how a streamlined system might operate.

"As I visualize it, the . . . procedure,

Certificate "Roundup"

The food industry hasn't received certificates for reduced amortization as lavishly as some others. Roughly, less than one-third of the applications for certificates of necessity have been approved—the rest denied or pending.

Among the largest turn-downs were Quaker Oats (a $2,700,000 prepared cereal plant) and National Biscuit (a $20,200,000 Chicago expansion).

In general, the Defense Production Administration has been fairly lenient with the fruit and vegetable people, but tough on the rest of the industry. Prominent among those getting approvals are: National Fruit Product Co., Inc., Winchester, Va., $859,000; Richmond Chase Co., San Jose, Calif., $370,000; and Sunshine Packing Co., North East, Pa., $809,000.

Also, Basic Vegetable Products, Inc., at Vacaville, Calif., $464,000; Green Giant Co., Greenco, Minn., $457,000; Hunt Foods, Inc., Hayward and Fullerton, Calif., $1,910,000; and Swift & Co., an undisclosed amount in the poultry field.

The smaller processor, however, has not been slighted. He's also getting his lean share of the scarce certificates. The accompanying table summarizes the situation up through mid October.

Certificates-of-Necessity Applications
(Action by the DPA Through Mid October, 1951)

Section of Food Industry	Number of Applications	Approved	Pending	Denied
Canned and dried fruits	16	7	6	3
Jellies, jams and preserves	5	2	1	2
Frozen vegetables	6	..	6	..
Canned and dried vegetables	40	14	24	2
Baking	3	..	..	3
Meat packing	59	..	7	52
Poultry packing	32	3	18	11
Milk products	8	..	5	3
Sugar	19	..	9	10
Candy and flavorings	15	1	14	..

Receives Chemical Award

Dr. Ernest W. Reid, president of Corn Products Refining Co., recently received the Chemical Industries Medal, awarded by the American Section of the Society of Chemical Industry for conspicuous service in applied chemistry.

He has been with Corn Products since 1943, first as vice-president of research and development and then director, before being elected president this year. Dr. Reid, who earned his Ph. D. from the University of Pittsburgh, was formerly associated with Carbide & Carbon Chemical Corp., and he was with the War Production Board during World War II.

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adapted to standards making, would work something like this: The Administrator, on his own initiative, or upon the petition of any interested person stating reasonable grounds, would publish a proposal to issue, amend, or repeal a standard.

"Opportunity would then be given to all interested persons to present their views, orally or in writing. The Administrator would next issue a proposed order. And if no objection were filed within a specified reasonable time, the order would become final.

"If objections were filed, a public hearing would be held on the issues to which the objections were directed, in accordance with present procedure.

"After the hearing, findings of fact based on substantial evidence would be required in support of administrative action on controverted questions. And with promulgation of the final order, these issues would be subject to court review, as now provided."

Ask More Dryed Produce

More and better dehydrated fruits and vegetables are needed at once by our armed forces. Up to date, only five items have passed the Quartermaster Corps' muster—apples, blue-

STEEL

Every Kind

Some steel products are in short supply but over-all stocks are still large, diversified

Plates, Structurals, Bars, Sheets, Tubes, etc. . . . Carbon, Alloy and Stainless Steels . . . .

RYERSON

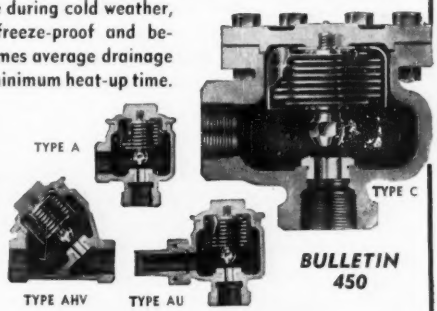
Joseph T. Ryerson & Son, Inc. Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco

NICHOLSON MAKES

Freeze-Proof Steam Traps

for Every Plant Use

Because they drain completely when cold, these four types of Nicholson steam traps are positively freeze-proof. Can be freely installed outdoors. Universally recommended for use in lines which need not be in continuous use during cold weather, because they are freeze-proof and because their 2 to 6 times average drainage capacity results in minimum heat-up time. The non-air-binding feature of Nicholson traps also notably facilitates heat transfer in severe weather. Sizes ¼" to 2"; pressures to 225 lbs.



BULLETIN 450

193 OREGON ST., WILKES-BARRE, PA.

W. H. NICHOLSON & CO.

TRAPS · VALVES · FLOATS

. . . to make your cleaning a faster, less expensive operation

Your floor cleaning problem is Holcomb's problem. When Holcomb cleaning engineers encounter unusual difficulties, the Holcomb research laboratory lends a hand. Actual samples of dirt from your floors are analyzed. The composition of the floors is carefully checked. Only after a thorough investigation does the Holcomb laboratory make its recommendations.

Ninety-five cents of every cleaning dollar goes to labor costs. So naturally your cleaning can be expensive if not done quickly, efficiently and with the *correct* products.

For more than fifty years Holcomb has specialized in time-saving chemicals and tools—cleaners, waxes, polishes, detergents, disinfectants and hundreds of different type brushes—all the equipment necessary for *any* cleaning job.

Call your nearby Holcomb Serviceman. He will make a complete cleaning survey, give you best recommendations for floors, walls, ceilings and equipment.

RESEARCH LABORATORY AND FACTORY
1601 Barth Avenue, Indianapolis 7, Indiana
Branches: New York 18 and Los Angeles 21

J. I. HOLCOMB
MANUFACTURING COMPANY
Scientific cleaning materials

The Nation's Largest Manufacturer of Industrial and Institutional Cleaning Tools and Cleaning Chemicals.

BRUSHES
SWEEPERS
SCRUBS, MOPS
WASHERS
WAXES, CLEANERS
POLISHES, HAND SOAPS
FLOOR FINISHES
DISINFECTANTS
DEODORANTS
INSECTICIDES

Since 1896

berries, cranberries, potatoes, and onions.

Biggest specification hurdle has been acceptability after six months storage at 100 deg. F. Covered here are ease of rehydration, return of the food to its original size, form and color; cooking qualities—without disintegration; and retention of original flavor and most of the nutritional value.

Among factors affecting the stability of dehydrated produce during storage, non-enzymatic browning is the main deteriorative process. Moisture content of the product and storage temperature are thought to control the rate of browning. Of additional interest is that browning can occur even in the absence of amino acids—the reaction having been observed between simple sugars and organic acids.

Use of in-package dessicants have been found to reduce browning where it is necessary to attain very low product moistures. Calcined lime can be satisfactorily used for the purpose.

These observations were made at a recent conference held at the USDA's Eastern Regional Research Laboratory in Philadelphia.

Need Further Agent Data

Present data on surface agents is not sufficient to warrant a judgment as to their use in foods.

This view has been put forth by the Food Protection Committee of the National Research Council. Members feel it is not possible to consider the use of such agents in one food, such as ice cream, without simultaneously considering the consumption level of the chemicals from other diet sources.

Specifically, the group found the data incomplete on toxicity, tolerance, metabolic fate, and the nutritive value of the surface active agents most commonly added to ice cream.

Push Poultry Inspection

A poultry-dressing plant inspection program is being proposed by the U. S. Public Health Service.

Several USPHS veterinarians and sanitary engineers have expressed themselves on the need for federal control in the *Journal of the American Public Health Assn.*—which generally carries the first proposals advanced unofficially by federal officials.

Whether any more inspection programs (for whatever purpose) are needed at the federal level is somewhat doubtful. Actually, in the case of poultry plant inspection, 27 states have legal authority to protect the public. Fourteen of these 27 already have poultry inspection programs set up.

Observers point out that public health protection is one of the "police" powers delegated to the individual states by the Constitution. And, they continue, the Federal Health Agency "is already operating many unconstitutional programs because no one has been aroused sufficiently to take the issue to court."

But because few congressmen will buck public health proposals, any measure for such an inspection program likely will get an Okay.

Equipment Group Formed

Over 20 companies engaged in manufacturing perishable-food processing equipment have formed an organization to (1) develop, promote, and maintain equipment standards; (2) assemble and disseminate statistical and legislative information; and (3) otherwise serve and protect the interests of its members.

Called the Perishable Agricultural Products Processing Equipment Manufacturers Institute, the group has opened offices at 511 Fifth Ave., New York City. An organizational meeting is scheduled for Jan. 22, 1952, at Convention Hall, Atlantic City, N. J.

Upgrading Tomato Products

Color standardization of tomato juice can be accomplished with the photo-electric "eye"—by controlling the trimming and grading of the raw material.

Product grade depends upon color to an extent of 30 percent, therefore this factor is probably the single most important grade criterion.

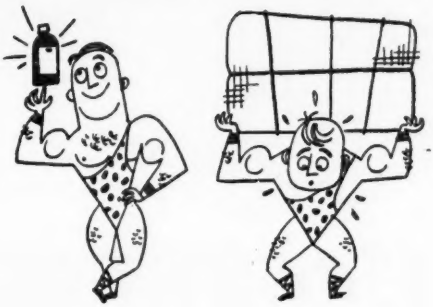
Researchers at the N. Y. State Agricultural Station at Geneva have determined that there is a direct relation between the color of the raw tomatoes and that of the product juice

"SOMETIMES I FEEL I'LL JUST NEVER BE ABLE TO LOOK ANOTHER POTATO IN THE EYE."

give your products

a new **"taste-lift"** with

SPISORESINS



● Samson made an unshakable place for himself in history by hefting mighty objects, and strong men the world over have since labored to emulate him. But the modern food processor and manufacturer of dry and liquid seasonings is seldom naturally equipped for such activity. Therefore to transport and store the heavy, awkward bags of spices his products require, he must perforce hire warehouses, trucks and several muscular, 20th century Samsons!

● Not so the manufacturer who has discovered **SPISORESINS!** For **SPISORESINS** require no more space than the neat, compact essential oil bottles on his plant shelf, and are as easy to use. Pourable, of superior flavor value, entirely free of mold and yeast spores, **SPISORESINS** simply eliminate the storage problem. A 5 lb. bottle of **SPISORESIN** Black Pepper is equal in flavor value to a 150 lb. bag of the spice itself. Solvent extractions of natural spices, **SPISORESINS** are available in all important Basic flavors and over 60 different Compounds.

● Give your products a "taste-lift"—your entire operation a "convenience-lift". Let the small bottle of **SPISORESINS** *retire* the extra warehouse, the truck, the sanitation problem, and the "Samsons" to the glorious, but inconvenient, past.

*** Reg. U. S. Pat. Off.**

D&O ESTABLISHED 1796

DODGE & OLCOTT, INC.

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ATLANTA · BOSTON · CHICAGO · CINCINNATI · DALLAS
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ESSENTIAL OILS · AROMATIC CHEMICALS
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Your needs-
OUR SPECIALTY

This condenser is 16″ DIA. x 12′ tube length; Bundle ¾″ O.D. type 316 Stainless tubes; Double tube sheet also of type 316 . . . manufactured by the Heat Transfer Division of DOWNINGTOWN IRON WORKS, INC. DOWNINGTOWN solicits your inquiry for heavy duty shell and tube equipment fabricated of Aluminum, Inconel, Nickel, Phosphor Bronze, Copper, Silicon Bronze and various grades of Carbon Steel. Some of these are welded by the Inert-Gas-Metal-Arc method. DOWNINGTOWN is experienced in building equipment with Bimetalic, Finned Tube and Impregnated Graphite.

Design and construction meet requirements of A.S.M.E. Code or other agency specified by customer. Equipment of our design is sold on a guaranteed performance basis or we will fabricate to customer's drawings. Modern facilities available for radiographing where required. *Remember:* "Your Needs are Our Specialty!"

Write on your letterhead for DOWNINGTOWN literature on shell and tube heat exchangers.

DOWNINGTOWN IRON WORKS, INC.
DOWNINGTOWN, PA.
STEEL & ALLOY PLATE FABRICATION
HEAT EXCHANGERS

NEW YORK OFFICE: 30 CHURCH STREET

—thus tying together the importance of accurate color measurement of the incoming material with product grade standard.

Photo-electric "eyes" have been successfully adapted to the grading operation, thereby providing means under which the tomatoes can be trimmed and blended most economically.

"Steady" Status for F&NAC

Permanent status has now been provided for the Food & Nutrition Advisory Committee which has been serving the Agricultural Research Administration of the U. S. Department of Agriculture.

This committee has been assisting the USDA research agencies in their studies, service, and educational work in the fields of food and nutrition.

The committee will continue work under the leadership of Dr. E. Neige Todhunter of the University of Alabama and Dr. L. A. Maynard at the School of Nutrition, Cornell University, chairman and vice-chairman, respectively.

Expect Niacin Expansion

Shortage of niacin, also called nicotinic acid, may soon be a thing of the past.

Increased production of this popular food enriching agent (used in bread and feeds) is directly tied in with a new synthetic process for pyridine, one of the alternate materials used for the manufacture of niacin.

Though pyridine, as well as the other raw materials, has been in very short supply, it has now been found that plentiful acetaldehyde and ammonia can be reacted to yield pyridine. Used is a process developed by Dr. R. S. Aries of New York City.

Dairy-Product Vitamins

USDA reports a new method of getting high yields of vitamin B_{12} by using propionic bacteria to ferment nutrient solutions or mashes that contain skim milk and whey. Propionic bacteria produce the holes in Swiss cheese.

Besides the B_{12}, propionic acid is also made. And it is noted that propionic salts are of value in preventing mold growth in bread and other foods.

Presence of lactic acid in the fermentable material and careful adjustment of the oxygen content during fermentation are necessary to give maximum yields of vitamin B_{12}.

According to R. E. Hargrove and A. Leviton of the USDA, who developed the process, a promising mean

is seen here not only for the production and isolation of crystalline vitamin B_{12} from dairy byproducts and nutrient mashes, but also for increasing the vitamin B_{12} content of such dairy foods as Swiss cheese, buttermilk, and other fermented milks.

Preliminary tests indicate that the new process will register yields as high as 1,400 micrograms of B_{12} per quart.

Meat "Color Cycle"

Display life of packaged fresh meats may be extended through controlled application of a "cycle of" color changes."

The cycle involves a change from the original red color of the meat through a stage of undesirable color, either gray or brown, and back again

(Turn page)

Hors d'Oeuvres

• A German plant has cut the time required for smoking fish from several hours down to 20 seconds using an electrostatic chamber to electrically charge high-speed smoke particles penetrating the fish. Wonder if they're equipped to handle sting rays?

• *The British Admiralty is crimson-faced these days due to discovery that canned salmon served aboard its ships was a little too pink—having come from red Russia.*

• This season saw the first commercial U. S. harvest of castor beans—the raw material for castor oil—down in Texas and Oklahoma. Stop frowning, kids—the production is already earmarked for industrial uses.

• *Dr. E. W. Flosdorf of the F. J. Stokes Machine Co. recently stated that "freeze-drying may prove to be the choicest preservation method for foods such as orange juice, beef, oysters, clams, and shrimp." No skidding, either.*

• According to a food packaging expert, most housewives buy foods on the basis of the wrapper—color being of particular importance. Yellow is the most popular in the U. S., whereas pink rings the bell "south of the border." While they last, a couple of box tops will get you a pair of rose-colored glasses.

• *Researchers are eagerly testing a variety of agricultural products and dryed cannery wastes as metal cleaning and polishing agents after observing the successful use of soft grits in standard sandblasting equipment to clean engine parts. Degrading . . . suh!*

• Corn cobs have been freed from price control in an attempt to stimulate their collection to meet sharply increasing demands from the furfural producers. Sounds like pretty rough business.

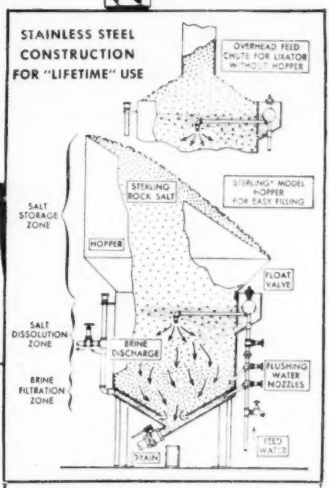
JUST TURN IT

AND GET

BRINE

That's Just Right Without Measuring Or Stirring!

STERLING ROCK SALT
BRINE DELIVERED BY PIPE TO EVERY POINT IN YOUR PLANT
• FLAVORING • WASHING • SOAKING
• BLANCHING • GRADING • BRINE PEELING
• ZEOLITE WATER SOFTENERS • PICKLING



• Why trust to "rule-of-thumb" measuring? Why go through the laborious shoveling, hauling, and hand stirring of salt and water? With International's Lixate Process for Making Brine you are assured accurate salt measurement every time. Stops waste through spilling. Saves time and labor.

• The Lixator *automatically* produces 100% saturated, free-flowing, crystal-clear brine which may be piped to as many points in your plant as you wish — any distance away — by gravity or pump. YOU SIMPLY TURN A VALVE to get self-filtered LIXATE Brine that meets the most exacting chemical and bacterial standards.

Savings up to 20% and often more in the cost and handling of salt have been reported by many Lixate users. Why not investigate?

HOW LIXATOR* WORKS

In the dissolution zone—flowing through a bed of Sterling Rock Salt which is continuously replenished by gravity feed, water dissolves salt to form 100% saturated brine. **In the filtration zone**—through use of the **self-filtration** principle **originated by International,** the saturated brine is thoroughly filtered through a bed of undissolved rock salt. The rock salt itself filters the brine. Nothing else is needed.

WHAT THE LIXATOR PROVIDES

- ✓ **Chemical and bacterial purity to meet the most exacting standards for brine.**
- ✓ **Unvarying salt content of 2.65 pounds per gallon of brine.**
- ✓ **Crystal-clear brine.**
- ✓ **Continuous supply of brine.**
- ✓ **Automatic salt and water feed to Lixator.**
- ✓ **Inexpensive, rapid distribution of brine to points of use by pump and piping.**

An INTERNATIONAL Exclusive

The **LIXATE*** *Process*

FOR MAKING BRINE

*REG. U. S. PAT. OFF.

INTERNATIONAL SALT COMPANY, INC., Scranton, Pa.

EXACT WEIGHT Scales checkweighing butter prints to eliminate packaging shrink. Jerpe Commission Co. Inc., Omaha, Nebr.

Your Fringe Costs — How Much ?

Your fringe costs! How much do they add to your present production line costs? This added overhead is ever present when (1) hourly paid labor is not at bench or station in actual productive effort (2) when equipment is inadequate or does not deliver as a smooth efficient operation should. On the labor side with 50% of all productive labor occupied in handling and packaging fringe labor costs can be the first threat to profits. On the equipment side a second threat can be controlled by sound plans, plus equipment to do the job and timing of the production line to fit the personnel. When checkweighing is involved the type of weighing units are vital, too. Use EXACT WEIGHT industrial scales for accuracy, adaptability, dependability, correct capacity and speed of operation. Remember nothing will cut fringe costs more than the right scales in the right place. Their capacity to save time, money, product and labor have been proven numberless times by production-minded engineers everywhere. Write for full details for your plant.

EXACT WEIGHT Scale Model #213-S, the most popular consumer packaging scale—Features (1) high speed operation due to extremely short platter fall, (1/8") (2) end tower construction which takes up less bench space, and permits uninterrupted production across the scale while commodities are being weighed all in direct line of vision, 1 lb. beam, notched type. Dial 1 oz. over and under x 1/4 oz. graduation—Capacity to 3 lbs.

EXACT WEIGHT SCALES

Industrial Precision

THE EXACT WEIGHT SCALE COMPANY

910 W. Fifth Ave., Columbus 8, Ohio

2920 Bloor St., W., Toronto 18, Canada

to red. Conditions under which these changes occur are critically dependent upon temperature and oxygen content of the surrounding atmosphere.

At present, these color changes are thought to be a direct result of bacterial action. However, an investigation of the chemistry behind the changes is underway in an attempt to find a chemical means of producing the color cycle—without producing the deleterious changes that usually accompany bacterial action.

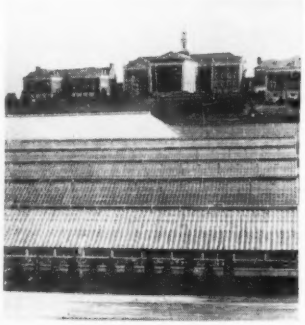
This project is being sponsored by the U. S. Bureau of Animal Industry at Rutgers U. An interim progress report was made at the Food Packaging Seminar of the recent Packaging Institute Forum held in New York City.

Unveil Versatile Carbide

A new series of carbides applicable to food processing equipment are announced by the Carboloy department of General Electric Co., Detroit.

Reported to have the virtue of complete inertness when subjected to processing corrosion customarily experienced with lactic, citric, and other acids, the new carbides are chrome-based, and are expected by the maker to have a wide variety of applications beyond those of the more orthodox tungsten carbides.

Produced from powdered metals, the new carbides contain approximately 70 percent of chromium by weight. Tungsten and cobalt—both scarce today—are not present.



Plant-Science Birthday

Fifty years of Federal research in the field of the plant sciences were recently hailed in a golden jubilee celebration at the USDA's Plant Industry Station, Beltsville, Md. Pictured here are some of the main buildings and greenhouses at the Station. Headquarters for all USDA research are also at the Beltsville site, which lies 12 miles north of Washington.

Coffee Packers Convene

Listening to a paper on smoke abatement by John Mazzie, members of the National Coffee Assn. learn of the growing resistance of cities to smoke from factories (see "Is Your Smoke Showing," Nov. FE). Convening in annual convention at Coronado, Calif., the group elected Edward Aborn their new president and W. F. Williamson executive vice-president. Seen at table is J. A. DeArmond, outgoing president.

Pilot Food Algae

Development of a commercial process for the culture of rapidly growing algae is proceeding satisfactorily at A. D. Little's, Cambridge, Mass. Looked upon as a possible inexpensive and plentiful food source, algae may also lead to key knowledge on utilization of solar energy.

The project, sponsored by the Carnegie Institution of Washington, D. C., consists of growing unicellular *Chlorella* in two different types of units. In one, a suspension of the algae is pumped continuously through a large transparent plastic tubular channel, while exposed to sunlight.

In the second unit, the algal suspension is circulated in a trough covered with a transparent plastic cover. Proteins and fats are harvested continuously.

Supercharged Foods

Electro-magnetic irradiation of foods may soon become of age in the processing field. X-rays and cathode rays look to be especially promising for the sterilization of foods without the use of chemicals and heat.

Dr. Bernard F. Proctor of M.I.T. recently reported that meat products

Automatic apple bath eliminates hand washing
• All dirt and insecticide sprays must be removed from apples before processing—usually a time-consuming, manual operation. To speed up this step in his plant, a leading processor installed a Cyclone Galvanized Flat Wire Belt equipped with flights. The apples are first dumped into a soak and then removed on the belt—eliminating all necessity for expensive hand-washing operations.
Cyclone's three belt types—Flat Wire, Chain Link and Flex-Grid—are designed to handle various processing problems in food plants. Our experienced engineers will be glad to tell you which belt will best meet your requirements. In the meantime write for a copy of our free catalog #4.
CYCLONE FENCE DIVISION
(American Steel & Wire Company)
DEPT. H-121, WAUKEGAN, ILLINOIS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK
USS
CYCLONE
METAL CONVEYOR BELTS
UNITED STATES STEEL

for
• SPRAYING
• WASHING
• RINSING
• COOLING
• AIR CONDITIONING
Get the most out of your Spraying Equipment with minimum power . . . with efficient spraying.
Use Yarway Nozzles. No internal vanes or other restrictions to clog or hinder flow. Two types—Yarway Involute-type producing a fine hollow spray with minimum energy loss, and Yarway Fan-type producing a flat fan-shaped spray with time-saving slicing action for cleaning.
Wide range of standard sizes and capacities. Cast or machined from solid bar stock.
Thousands in use. Write for Bulletin N-616.
YARWAY SPRAY NOZZLES
YARNALL-WARING COMPANY
127 Mermaid Avenue, Philadelphia 18, Pa.
INVOLUTE-TYPE FOR HOLLOW CONE SPRAY
FAN-TYPE FOR FLAT SLICING SPRAY

DETECTO SCALES

There's a precision-accurate Detecto Scale for your specific weighing and counting need. The Detecto helps increase production, yet assures you maximum accuracy by making slightest weight discrepancies immediately visible.

DETECTO ALUMINUM SPEED SCALE

For increased production at lower cost! One operator with one Speed Scale does as much as two operators with ordinary scales. Sturdy, precision built, super-accurate. Ends overweight losses.

Write for Literature

DETECTO SCALES • INC.

MAKERS OF FINE SCALES SINCE 1900

540DS PARK AVE. • BROOKLYN 5, N.Y.

SCALE ENGINEERS IN ALL PRINCIPAL CITIES

SYNTRON

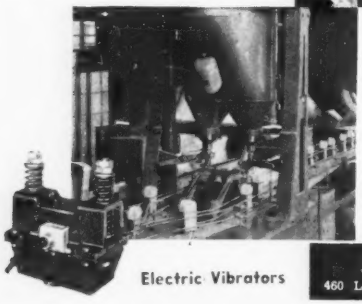
Provides The Easy, Economical Way To Handle Materials

On-the-job reports of Syntron Vibratory Equipment have repeatedly emphasized their cost and time-saving features.

A bakery increased the efficiency and reduced the cost of their vanilla water packaging operation by applying Syntron Model F-O Vibratory Feeders.

A Syntron Model V-15 Electric Vibrator, mounted on a packaging machine hopper greatly reduced stoppages due to materials arching and plugging in the hopper.

Vibratory Feeders



Electric Vibrators

Syntron Equipment is easy to adapt with minimum change to your present processing methods.

Your inquiries on Vibratory Feeders, Electric Vibrators, Hopper Level Switches, Packers and Jolters, etc., are welcome.

WRITE FOR DESCRIPTIVE DATA

SYNTRON CO.

460 Lexington Ave. Homer City, Pa.

in particular are responding particularly well.

In these studies, cathode rays have been accelerated to greater than 4 million volts with the Van de Graaf Electrostatic Generator and to 16 million volts with a Linear Accelerator.

Penetration to depths of 1 in. are now common—sterilization taking only a matter of seconds. It has been found that the maximum penetration is inversely proportional to material density (including container).

Another interesting observation is that microorganisms and enzymes are killed at very different rates, the enzymes being better able to withstand the effect of the ray's action—thus opening a door to a possible method of isolation.

Mushrooms From Waste

Mushroom "roots," grown in the waste materials from fruit canning factories, may become a useful food product of the South.

Root-like mushroom mycelia have been grown successfully in laboratory "liquid farms" at the University of Florida. In the tests, a white Florida mushroom, *Agarius blazei*, was grown in waste from the citrus industry.

The mycelia are similar to the white, hair-like threads seen in moldy bread. They develop a unique "meaty" taste when heated to 75 deg. C. Further, they compare favorably with whole wheat kernels as a source of the B-vitamins.

Shrimpers Join

Grouping Mexican and U. S. interests, the Shrimp Assn. of the Americas has been organized to launch a program of improved quality control, research, advertising and promotion. The U. S. is represented by the Texas Shrimp Assn.

Headquarters for the group have been set up in Brownsville under the direction of Virgil Versaggi, president.

Seeks Better Citrus Flow

In an move to insure a steady flow of citrus fruit to its Florida concentrating plants, Minute Maid Corp. is now offering a profit sharing plan to growers.

Essentially, the plan guarantees the grove owner his cost of production, with payment on fruit delivery of 11c. per lb. of juice solids, plus 40c. per box for picking and hauling. In addition, the grower would share 50-50 with Minute Maid in the company's gross yearly profits—in proportion to amount of fruit he supplied.

The company is reserving the right

Announces New Orange Drink

Walter S. Mack, recently elected president of Nedicks, Inc., N. Y., has announced the development of a new pure fruit orange drink as part of a program to revamp and modernize the operations of the lunch and snack chain. The juice is reported to be homogenized and fortified with vitamin C.

A special process has been worked out at the food technology laboratories of M.I.T. to produce the drink. No artificial preservatives or flavors are added, but pasteurization is used in the patented system.

(1) to limit participation to half of its fruit requirements, and (2) to veto the plan unless two million boxes of fruit are subscribed—excluding that from its own groves.

This program is considered to be a competitive move, following the recent arrangement between Snow Crop and the Florida Citrus Exchange.

Newfoundland Oil Plant

A marine and vegetable oil-hardening plant is to be constructed at Harbor Grace, Newfoundland, with plans set for processing oil from whales, seals, herring, caplin, and also cottonseed and peanuts.

European capitalists (as yet not identified) are backing the project with machinery, structural steel, and equipment valued at $200,000. A similar amount will be advanced by Newfoundland's government.

USDA Grade Standards

Recent actions by Production & Marketing Administration of USDA on U. S. Grade Standards and related activities include the following:

Frozen cauliflower: Second revision, page 10332, Oct. 11 *Federal Register*, effective Nov. 10 (correction on page 11206, Nov. 3, *Federal Register*).

LA PORTE FLEXIBLE STEEL CONVEYOR BELTING

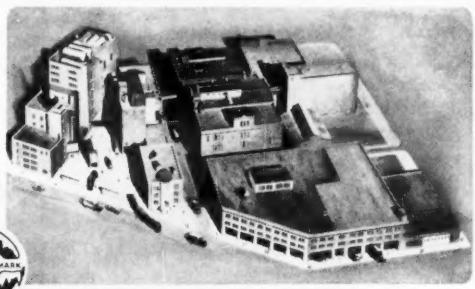
Whatever your process—canning, freezing, dehydrating or other operations—rugged, long-lasting LaPorte Belting *out-performs* all other types of belting. It quickly and safely carries your product through every processing job . . . from loading hopper to shipping room.

LaPorte flexibility insures tighter grip of belt on friction drum . . . can't creep, weave or jump. Provides perfectly flat surface for containers, empty or filled. Highly resistant to heat and cold. *Open mesh construction* permits faster, easier cleaning . . . makes possible the circulation of air, heat, cold or moisture around products in process. Choose LaPorte for extra trouble-free service.

Write at once for literature and prices—no obligation

LA PORTE MAT & MFG. CO.
BOX 124 LA PORTE, INDIANA

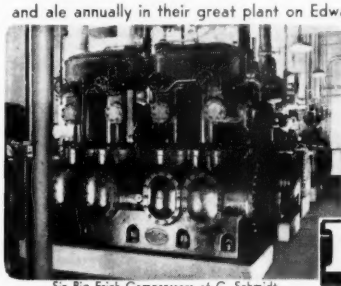
Philadelphia's Largest Brewery Uses 2300 Horsepower of



TRADE FRICK MARK

Refrigeration

C. Schmidt and Sons, Inc., founded in 1860, now make over a million barrels of beer and ale annually in their great plant on Edward Street.



Six Big Frick Compressors at C. Schmidt and Sons' Brewery

A pair of Frick four-cylinder ammonia compressors was installed at Schmidts' twelve years ago. Today this battery includes six machines, the largest with motors of 450 hp. each.

For dependability, stick to Frick Refrigeration. Let us submit estimates on your needs.

DEPENDABLE REFRIGERATION SINCE 1882
FRICK CO.
WAYNESBORO, PENNA. U.S.A.

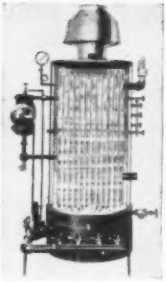
Also Builders of Power Farming and Sawmill Machinery

QUICKLY PAYS FOR ITSELF

NO BOTHER OR WORRY

Bare Minimum of Floor Space

the KANE BOILER PACKAGE



The KANE Boiler is built to A.S.M.E. specifications. In sizes to 30 H.P.

The M-K-O Automatic Boiler Feed returns condensate and supplies small quantities of hot water as needed to the KANE Boiler.

Here's a truly *"unitized"* steam supply—a compact, self-contained BOILER PACKAGE that is completely automatic . . . requires no attendant and only a bare minimum of floor space, but gives full horsepower rating. The KANE BOILER PACKAGE includes: the correctly sized Automatic Gas-Fired Boiler complete with gas burner and controls to maintain required steam pressure; and an M-K-O Automatic Boiler Feed system designed to return condensate and supply make-up water as required for highest operating efficiency.

Engineered Steam at its best with four decades of experience at your disposal—so, send your steam problem to us for study and recommendation.

ENGINEERED STEAM AT ITS BEST

MEARS-KANE-OFELDT INC.

P.O. BOX 223 BRIDGEPORT, PA.

FOUR DECADES OF AUTOMATIC GAS-FIRED BOILER MANUFACTURING EXPERIENCE

heart of the strainer

A high-grade, woven Monel wire screen is the heart of the Yarway Strainer—one reason why hundreds of thousands of these strainers are policing pipe lines in nearly every industry.

OTHER REASONS—

- cadmium plated bodies and screen caps
- straight threads, machined faces and spark-plug-type gaskets on screen caps
- ten sizes from ¼" to 3"

Sold by 216 industrial distributors. Write for Bulletin S-203.

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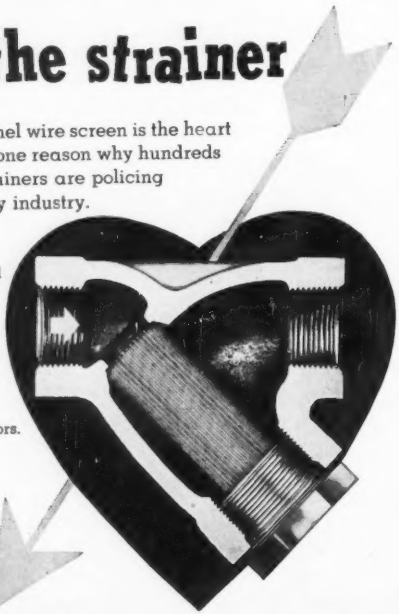


YARWAY **STRAINERS**

Schedule of Events

January

14–17—Plant Maintenance Conference and Show; Convention Hall, Philadelphia.
15—Manufacturing Chemists' Assn., Inter-Industry conference on chemicals in foods; Hotel Statler, New York.
16–18—Canadian Food Processors Assn.; Chateau Frontenac, Quebec.
19–23—National Canners Assn., National Food Brokers Assn., and Canning Machinery and Suppliers Assn., annual convention; Auditorium, Atlantic City.
21–22—National Preserves Assn., annual convention; Marlborough-Blenheim Hotel, Atlantic City.
28–30—National Dairy Council, annual meeting-winter conference, Hotel Syracuse, Syracuse, N. Y.

February

10–12—Institute of American Poultry Industries, 23rd annual fact finding conference; Municipal Auditorium, Kansas City, Mo.
19–21—Technical Pickle School, Michigan State College, East Lansing.

Watermelons: Standards in effect since Feb. 12, 1945, now published in compliance with Administrative Procedures Act, page 10331, Oct. 11 *Federal Register.*

Frozen concentrated grapefruit juice: New, page 11324, No. 8 *Federal Register.* Effective Dec. 8.

F&DA Food Standards

Status of food standards of Food & Drug Administration in early November is reviewed below:

Sea Food Inspection

Inspection of fresh and frozen shrimp, on an optional basis, is now officially available. Regulations were published on page 11072, Oct. 31 *Federal Register.* This extends the canned shrimp inspection service, for which no change in regulations is made.

Future Hearings

1. *Salad dressing:* Rehearing, standards of identity; "skim milk and milk products" proposed as optional ingredients. F&DA gathering data. No hearing date set yet.

2. *Process cheese food:* Amendment, standard of identity; skim milk cheese proposed as optional ingredient. No hearing date set yet.

3. *Canned tuna:* Hearing in early 1952 expected, but no date set yet (initiative of Administrator).

4. *Frozen vegetables:* Informal conference held in Oct. Formal hearing unlikely before another season (initiative of Administrator).

Hearings in Progress

1. *Ice cream:* New, standard of

identity. Direct testimony on harmlessness of surface active agents was resumed as scheduled on Nov. 5, with Atlas Powder Co. anticipating approximately two weeks of hearing time for its witnesses, who are primarily the authors of the reports submitted to the hearing clerk in October. One witness was scheduled by Swift & Co. No other witnesses were in room when hearing reopened. Cross-examination will follow a two-week recess scheduled to give interested parties opportunity to analyze the direct testimony. December adjournment is a possibility.

2. *Canned pineapple and canned pineapple juice:* New, standards of identity, quality, and fill of container. Over 200 exhibits were filed by the pineapple industry in 3½ days of hearing beginning Oct. 30. Further data on proposals for standard of fill for canned pineapple will be received on Mar. 4, 1952. The record was closed for all other parts of hearing, and briefs are due by Dec. 17. Principle stumbling block in hearing was a determination of proper proportion of solid and liquid in proposed standard of fill.

Tentative Order Awaited

Residue tolerances: On fresh fruits and vegetables, new. Expected after first of year. Hearing adjourned in Sept. 1950, briefs were filed in Dec. 1950.

Final Orders Awaited

1. *Bread:* New, standard of identity. Expected soon. Tentative order published Aug. 1950, exceptions filed in Nov. 1950.

2. *Frozen fruits:* New, standards of identity and fill. Expected soon. Tentative order published in Oct. 1950, exceptions filed in Jan. 1951.

3. *Canned mushrooms:* Amendment, standards of identity and fill. Expected soon. Tentative order published in Feb., exceptions filed in April.

4. *Fruit preserves, jellies, and butters:* Amendment, standard of identity. Expected soon. Tentative order published in July, exceptions filed in August.

5. *Canned tomatoes:* Amendment, standard of identity. Expected soon. Tentative order published in September, no written comments received by Oct. 22 deadline.

6. *Margarine:* Amendments, standard of identity. Expected soon. Tentative order published on page 10492 Oct. 13 *Federal Register*. Would accept synonymous name "margarine", permit use of citric acid and isopropyl citrate to retard deterioration, raise vitamin A minimum content to 15,000 USP units per lb., specify USP method for determination of total biologic vitamin A activity, and per-

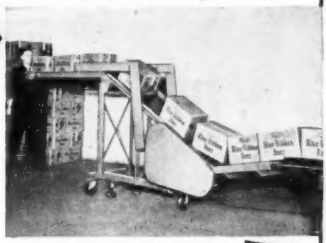
MODERN TIME AND COST SAVERS BUILT BY... Standard GRAVITY & POWER CONVEYORS

FASTER HANDLING IN SHIPPING ROOMS... With the HANDIBELT

Conveys bags, cartons, boxes horizontally or at any decline and incline angle within its range. Easily wheeled about by one man—easy to adjust and use — fits in crowded aisles, cars and freight elevators. Handles packages up to 135 lbs. TWO SIZES: No. 11 Handibelt, 11 ft. long, piles to 7 ft. 6 in.; No. 16, 15 ft. 9 in. long piles to 10 ft. 6 in. Write for HANDIBELT Bulletin — address Dept. FE 121.

FASTER PILING IN WAREHOUSES ...with the HANDIPILER

For loading, unloading, stacking and elevating sacks, boxes, cases, and cartons. Adjustable boom reaches to rear of storage piles or far into cars, trucks, trailers. Reversible apron — conveys commodities up or down. Piles to 17 ft. — handles packages up to 100 lbs. Saves lifting — carrying — cuts handling time in half. Write for HANDIPILER Bulletin—address Dept. FE 121.



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General Offices: North St. Paul, Minn.
Sales and Service in Principal Cities.

Send for Standard Bulletin No. 63-B describing gravity & power conveyor units. Address Dept. FE 121.

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When You Use
Low Temperature
USE CORK

The time to make sure of your insulation protection is before you build or expand. Get the facts on Cork insulation when they can do the most good. Cork is so efficient in insulating properties that its performance has long been the accepted standard for low temperature requirements. Its wide usage in the refrigeration industry is due to its proved record for more than 40 years. Mundet refrigeration engineers are experienced in all details of temperature control. Write to us now for recommendations and estimates . . . let us help you secure the most profitable use of low temperature. Mundet Cork Corporation, Insulation Division, 7101 Tonnelle Ave., North Bergen, N. J.

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CORK INSULATION

Complete
PRODUCT MIXING
with
LEE DOUBLE-MOTION Center Line Scraper AGITATORS

Standard equipment for over 20 years.

Safe Controlled
RAISING AND LOWERING
with Hydraulic Operated CYLINDER

Operates directly from your present water system

Swings out
FOR EASY CLEANING

Cleaning over kettle means

- No hot messy parts to disassemble
- Savings in time and labor
- No contamination of parts

Our descriptive bulletins on these units will interest you—*WRITE FOR THEM.*

LEE METAL PRODUCTS CO.
416 PINE STREET
PHILIPSBURG, PA.

ALL LEE KETTLES ARE MADE TO A.S.M.E. CODE

mit an all-vegetable product using as a milk substitute a combination of finely ground soybeans and water under certain specified conditions. Written comments received until Nov. 12.

Standards Completed

None since those last reported (p. 197 Sept. FE).

—End—

Concrete Floors

—Continued from page 114

as nine years, and it is still good. On our earlier heavy duty concrete floors, we had a different and much more expensive aggregate than we are now using. But we expect to chalk up a record of equal success with the granite.

Our only bad failure occurred when we moved a pig's-feet operation to one of these floors. The vinegar ruined it in short order. We have also had some serious surface etching of floors at locations where equipment is subject to such cleaning materials as trisodium phosphate. This type of damage can be minimized if floors are always thoroughly cleaned immediately after such compounds have been used.

Reports Look Good

We have gone so far as to use this type of floor inside a smokehouse. The floor in question has now been in service for two years without serious damage, although there is a slight spalling at places where minor cracks have developed. Effective expansion joints all around the walls might have prevented even this damage.

Under normal packing house use—with animal fat and brine present and daily hot water washings—the surface will show minor etching after a relatively short time. We do not consider that bad.

These floors will not disintegrate under normal use, although occasionally some holes may develop where the compaction was not thorough. These can be cut out and patched with relative ease by using the same concrete mix and methods outlined.

We have found that air drills with $2\frac{3}{4}$-in. star bits mounted on a cart or dolly do a more effective job of preparation for patching than paving breakers. The drills are restricted in downward movement, and they clean the surface without shattering the slab. They also bring a better square cut at the edge of the patch.

Patches must be exactly flush with the surrounding concrete surfaces. Overfilling or underfilling will result in relatively rapid wearing at the edges. In the curing stage, these patches must

SCRUBBING CORROSIVE GASES ?

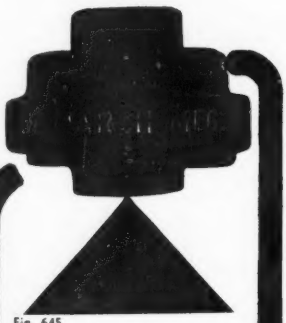

Fig. 645

Are your scrubbing nozzles as efficient as you think they could be? Do they resist the corrosion or wear conditions satisfactorily — produce the breakup and distribution you would like?

Outline your spray problem for use—if your liquid can be sprayed with direct pressure at all—Monarch can furnish the nozzles.

NOZZLES FOR:

- OIL ATOMIZING
- HUMIDIFYING
- AIR WASHING
- DESUPERHEATING
- SPRAY PONDS
- MILK POWDERING
- ACID CHAMBERS
- CONCRETE CURING

Write for Catalog 6-A and 6-C

MONARCH MFG. WKS., INC.
2517 E. ONTARIO ST.
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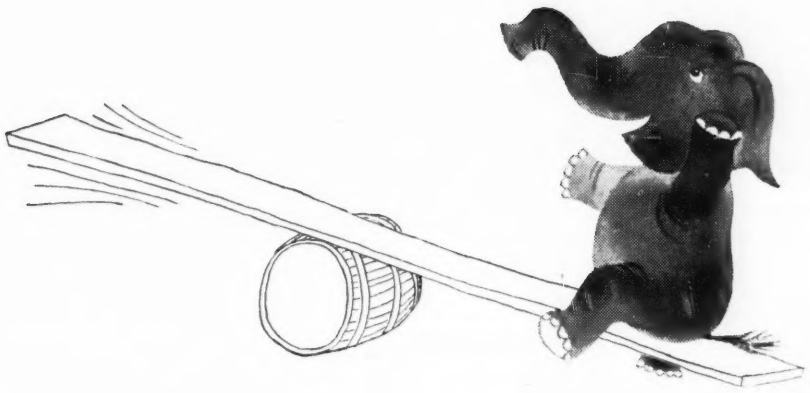

Give your product a lift with Wyandotte Better Blend Soda!

Use Wyandotte Better Blend Soda as a leavening agent in self-rising flours and baking powders. Use it for effervescence in mineral waters and soft drinks. Use it, too, for preservatives, disinfectants and neutralizers.

Wyandotte Better Blend Soda is made especially for the food industry. It mixes easily and thoroughly, gives you a consistent product. It is non-caking, will not clog machinery. It is pure and uniform.

Why not write for the full facts on this fine product?

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Cincinnati 2, Ohio, 825 Dixie Terminal Building . . CHerry 4941
Detroit 26, Mich., 1319 Dime Building . . . WOodward 1-1014
New York 17, N. Y., 60 E. 42nd Street . . . MUrray Hill 2-1780
Pittsburgh 22, Pa., 1114 Oliver Building . . . . GRant 1-0640
St. Louis 1, Mo., 1430 Paul Brown Building . . . CHestnut 6373
Los Angeles 12, Cal., 114 West College Street . . CApitol 4212

WYANDOTTE CHEMICALS CORPORATION
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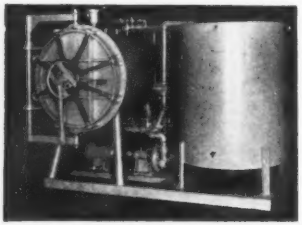
HERCULES FILTERS

FOR ALL TYPES OF

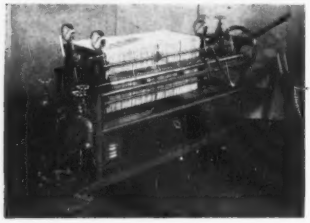
LIQUIDS

SUCH AS

- Beverage Syrups
- Sugar
- Water for Beverages
- Wines, Beer, and Liquors



Pressure Leaf Filters For Clarification by removal of particles in suspension at high flow rates.



Sheet Filters for ultra clarification or polishing.

Asbestos Pads and Loose Asbestos Fiber from our own Arizona mines, treated by a process that makes them commercially iron and calcium free.

•

Hercules fully equipped laboratories and experienced technical staff will help you solve your filtration problems.

HERCULES FILTER CORP.
210–21st Ave., PATERSON, N.J.

be protected from traffic at least as long as the original floor.

The above article is taken from a paper presented at the American Meat Institute's recent 46th annual meeting in Chicago. Photos illustrating the method of laying the concrete are courtesy of the Portland Cement Assn.
End (Resume reading on page 115)

Moving Millions

—Continued from page 71

Upon delivery, Borden employees take over, first removing the "flats" from the elevator so fork truck operators are not forced to work in limited space.

Fork trucks then take the pallet loads off the flats, move the loads to assigned aisles and—following a predetermined pattern—tier them in stacks. Cartoned goods are built in locked loads to assure stability in stacking.

The company's Grocery Products and Cheese Divisions occupy the third floor. Full use of cubic area is made by the former, while the latter, tiering entirely within refrigerated areas, utilizes racks for holding palletized loads. There is no upsetting of rigidly controlled temperatures in the refrigerated zones, or danger of contamination, since the battery-powered trucks operate fume and heat-free.

In outward shipment, fork trucks and elevators are again coordinated, but this time hand-lift trucks, rather than flat trucks, are used for horizontal movement.

On the shipping floor, orders are built up in uniform pallet loads, moved onto elevators by the same battery-powered fork trucks, and discharged at the first-floor truck loading dock (Borden outlets in the New York City area are serviced entirely by highway trucks). Pallet hand-lift trucks then move the loads from elevator to truck side, or, in the case of large orders, pallets are loaded directly into trucks.

Operations run 8 hr. a day, 5 days a week, with the 2,000 lb.-capacity electric trucks. They can tier to a height of 144 in. To eliminate lost time due to faulty equipment a program for greasing, servicing and checking the trucks is maintained, along with a battery checking and cleaning operation. Spare storage batteries for the trucks are kept on hand in case of any on-the-spot power failure.

Two-way, double-faced wood pallets, each 37 x 43 in., are used normally, however for handling bags and barrels, the 48 x 48 in. size pallet was found to be more practical.
End (Resume reading on page 72)

HERE AT STANDARD BRANDS (Fortification Headquarters) we're helping many of America's foremost processors give old products new life... create exciting new ones. And at amazingly low costs!

One of our technical men will be pleased to consult with you. No obligation! Special Products Division, STANDARD BRANDS INCORPORATED, New York 22, N. Y.

VITAMIN D PRODUCTS: Hy-Dee Irradiated Dry Yeast, Irradiated Dry Yeast Type 700-H, Viosterol (Irradiated Ergosterol).

NATURAL B-COMPLEX PRODUCTS: Pure Primary Dry Yeast (brewers' type), Bee-Flex Products, Yeast Extracts, Yeast Extract and Liver, Fortified Yeast with Iron.

Fleischmann's

"First For Food Fortification"

Send us a sample

OF ANY STOCK YOU WANT TO PULVERIZE

We'll make a test grind with

SCHUTZ-O'NEILL PULVERIZER

You will receive our Engineering Report suggesting the best method to use and the type of Schutz-O'Neill Pulverizer and any receiving or sifting equipment suited to your requirements.

SCHUTZ-O'NEILL offers you the benefit of more than a half century of experience in rapid, accurate, dustless pulverizing of any dry, grindable, non-gritty stock.

SCHUTZ-O'NEILL Pulverizers are made in 6 sizes with capacities up to 2000 lbs. per hr. Also Gyrator Sifters, Roller Mills, Receiver Boxes, Collectors, Hammermills, etc.

When sending sample, be sure to State fineness desired.

ESTABLISHED 1893 SCHUTZ-O'NEILL CO.
309 Portland Ave., Minneapolis 15, Minn.

Your Packaging Line

—*Continued from page 79*

is limited; (7) price (compare with that of other units capable of doing a similar job); and (8) availability of the equipment.

LAYING OUT PACKAGING LINES

31—What are the better methods to use when setting up and laying out packaging lines?

A—Obtain a standard layout drawing of the equipment from the manufacturer, and then make templates of the units and conveyors.

If the new line is an addition to others, install the new machines parallel to the other equipment to get a streamlined appearance. However, if this is not possible and the new line must go in another area, make certain that there is sufficient working space around each machine for mechanics and sweepers.

Allow enough space for trucking packaging materials to the machines and for removing whole units in the event that they must be pulled out for overhauling.

Arrange the equipment to minimize labor requirements. For example, in the new packing-floor layout at our Chicago plant we plan to install all lines in a horse-shoe or box formation so that an operator can run one line. Otherwise, it will be necessary to employ more operators to handle the production.

Study your case-sealing and conveying installations. If the line is installed at too great a distance, it will be necessary to use additional conveyors or to truck the cases.

Mount your equipment on padding to eliminate noise and vibrations. We are using Elasto Rib, which is manufactured by Korfund Co., Long Island City, N .Y.

In the event that you are operating a small plant and do not have the necessary technicians, submit a drawing of available area to the manufacturer and request several layout suggestions. Then let the manufacturer check your final layout drawings, particularly for conveyor lengths and turn-tables.

32—How do you get your packaging materials to the lines?

A—At present, cartons, liner paper, and shipping cases are delivered to the packing floor on pallets. However, at our Chicago plant, we are rearranging our facilities. Plans are underway to store the cartons on the floor above the packaging lines for feeding them by a multiple-step elevator system—one elevator to supply two packaging lines. This new system will relieve much of the congestion on the packing floor. It will also be more economical and it will facilitate housekeeping.

HANDLING CASED GOODS

33—How do you handle your finished cases at the end of the packaging line?

A—A caser at the end of each line manually loads the containers and then slides them onto a conveyor that carries them to automatic case sealers.

When more than one line is running the same size cartons and shipping cases, a gather-up belt feeds the containers to a single case sealer. A single case sealer is used for each line handling a different size carton.

At our California plant, we use automatic, self-adjusting case sealers. A conveyor, running in front of several lines, picks up the different size cases and carries them to the overhead case sealers. Sealed cases are then conveyed to the warehouse.

Again, at our Chicago plant, we plan to use the floor below the packaging line for container storage and casing. Plans are to bring the packages through an opening in the packing floor, then convey them to automatic case openers, loaders, and sealers. An overhead conveyor will finally deliver the sealed cases to the warehouse.

COST ACCOUNTING METHODS

34—How do you cost-account your packaging operations?

A—There is a cost-accounting system at each plant that is packaging foods. This system is set up to determine actual cost by product and by size of package. In addition, there is a system of related monthly reports for controlling ingredients, packaging materials, and labor.

Engineering estimates are established for each ingredient and packaging material. These estimates include tolerances that have been recognized as inherent in each operation. Monthly comparisons of actual usage with these estimates show current and cumulative quantity and dollar variances and percentages of variations of variances from standards by products by items.

Manufacturing expense is functionally classified by departments. Actual man-hours and dollars of labor are accumulated by products, where practical, and in the packing department by size of package. Labor engineering estimates are also established in this manner. And comparisons of actual and estimated man-hours are made weekly.

Labor that is not charged directly to products and sizes, or other department expense, is allocated, by recognized cost-accounting methods, to products and, in turn, to size of package.

From the detail of actual ingredients and packaging material usage by items, and labor and expense by products and size, we are able to determine actual production costs for each product and size package.

End (*Resume reading on page 80*)

BOTTLES, JARS, CANS, CONTAINERS
Get a Smooth Ride
ON THE SANITARY
Styl-O-Matic CONVEYOR

NO SPILLAGE
NO BREAKAGE

They ride "like a dream" on the smooth table-top surface of the #815 Rex Chain . . . with no rough or high spots to cause spilling or breaking. And there are no "pockets" to encourage bacteria growth! Available in steel or stainless steel in any length and three standard widths. Sturdily built for years of trouble-free use. Easily installed and serviced.

Carries your products safely and smoothly in a single file through various stages of your production line, such as filling, capping, labelling, etc.

MAIL THIS COUPON FOR FULL DETAILS

FREE!

ISLAND EQUIPMENT CORP. Dept. FE 12
27-01 Bridge Plaza North
Long Island City 1, N. Y.

Sounds interesting. Send me full details on your No. 815 Bottle Conveyor and a copy of your Styl-O-Matic Catalog.

COMPANY.....
NAME.....
ADDRESS.....
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ACCRITEM

Provides Accurate Low Cost Heat Control for liquids or air

Compressed air or water operated

POWERS

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Small Size
Easy to Adjust

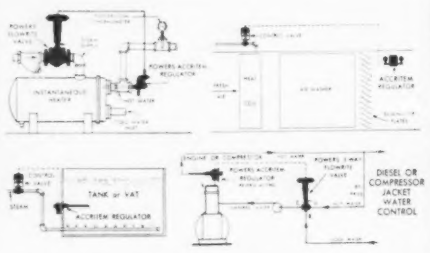
Ranges: 50 to 250° F. and 150 to 350° F.

Use ACCRITEM to control pneumatic or water operated diaphragm valves. Calibrated dial provides easy temperature adjustment. It is easy to install. Has adjustable sensitivity and over-heat protection.

Dependable—rugged construction of this heavy duty regulator insures many years of reliable service.

Size—regulator head is only 2⅞" x 3⅝", sensitive bulb is 12" long, diam. ½" with ½" I.P.S. connection.

Use POWERS ACCRITEM REGULATORS for



Also—Air conditioned bakery proof boxes and fermentation rooms, rotary type dryers and many other applications.

Powers quality line of FLOWRITE and METAFLOW diaphragm valves controlled by a Powers ACCRITEM Regulator provide an unbeatable combination for better control.

Write for Bulletin 316

THE POWERS REGULATOR COMPANY
3458 Oakton St., Skokie, Illinois (AMA)
Established 1891 • Offices Over 50 Cities • See Your Phone Book

Men & Companies

William H. Preis was recently elected vice-president of The Grand Union Co., New York.

Industry

Blaw-Knox Co. has contracted with **Union Oil Mill, Inc.,** to construct a cottonseed oil extraction plant at West Monroe, La.

British Columbia Packers has taken over operation of a fish processing plant at Canso, B. C., with promise of a $1,500,000 expansion program.

Bru-Coffee Co., has been established in Buffalo, N. Y., by Walter F. Rahn.

Bulgarian Yogurt Products Co., St. Louis, has started production on a national scale of what is to be known as Dr. Cristof's grade A Bulgarian yogurt. It will be distributed by the Daily Farm Dairy Co., St. Louis.

Corn Products Refining Co. recently elected to its board of directors James A. Moffett and Robert W. White.

Evergreen Preserving Co., Inc., has been founded in Buffalo, N. Y., under Nathan O. Damon, Montgomery Derrans Cooley, and Robert J. Hodgson.

R. C. French Co., Rochester, N. Y., will transfer the manufacture of the company's instant potato product from the firm's Rochester plant to Idaho. Production of other items in the company's line are not affected.

General Foods' Jell-O Div. has made the following appointments: David W. Thurston, merchandising manager; Robert A. Davidson, pudding merchandising manager; and H. M. Cleaves, sales and advertising manager.

Hewlett Bros. Co. has opened a new plant in Salt Lake City with facilities for processing preserves, jellies, syrups, and allied foods. Equipment includes: A 6-ft. cooking kettle system of 250 and 500 gal. capacity, and automatic packaging and labeling machine, and four large warehouses.

Kraft Foods Co. has begun construction of a new regional warehouse in Pittsford, N. Y., to handle wholesale distribution in the Rochester area. Offices and storage room will be included in the 14,000 sq ft. one-story building.

Krispy Kernels Ltd., Canada, has been incorporated, with head office to be in Quebec.

Purity Flour Mills Ltd., Toronto, is introducing three new cake mixes in Canada, including white, chocolate, and ginger bread.

Langdendorf United Bakeries, Inc., is building a new $1,000,000 bread plant at Seattle and a $600,000 plant at San Jose, Calif.

Real Fresh Milk, Inc., Visalia, Calif., expects to be producing canned fresh milk by late spring of 1952. Product will go to the armed forces in foreign markets.

Sunshine Biscuits, Inc., has purchased a twelve-acre tract for construction of a new biscuit and candy plant.

Personnel

Robert F. Bender has been appointed vice-president and treasurer of the Minute Maid Corp.

H. W. Burris of Canton, Ohio,

John D. Morgan is new sales manager of Halter's Pretzels, Inc., Canton, Ohio.

Let J & L Steel Drums and Pails

help Your Products Sell Themselves

J&L STEEL

Representative samples of J&L's complete line of steel shipping pails showing (top to bottom) the ring seal, closed head and lug covers.

Your quality product and a J&L container are a combination that you can be doubly sure will catch the customer's eye. Besides affording maximum protection against damage or contamination, J&L Steel Drums and Pails offer an opportunity to add measurably to the sales appeal of your product. Our artists are at your disposal to assist you in creating a distinctive, decorative package.

We can provide all types of Closures, Finishes and Decorations

Heavy-duty ICC Drums	Light-gage Drums 55, 30 and 15 gal. capacity and 100-lb. Drums	Lightweight Drums for Chemical and Powdered materials	Steel Pails for Foods, Chemicals Oils—1-10 gal. cap.

Why not write for a free copy of our booklet "It's Safer to Ship in Steel." It will give you important information on J&L Steel Pails and Drums.

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Removes air from liquid food products during the continuous High Temperature Short Time pasteurization process prior to homogenization.

What's more, the VACUUMIZER is adaptable to ANY HTST system.

Send for new, descriptive bulletin.

Patent applied for

Chester-Jensen Company

5th AND TILGHMAN STS. CHESTER, PENNSYLVANIA

Thomas F. Griffin has been named to succeed Milton Roberts as purchasing agent, at Holyoke Works, Worthington Pump & Machinery Corp.

---

is newly elected president of the National Pretzel Bakers Institute.

Herbert C. Claridge was re-elected president of the Tea Assn. of the U. S., located in N. Y. C.

W. E. Derrick has been named a vice-president of Standard Milling Co., Chicago.

J. A. Galve is new director of bakery research at E. Kahn's Sons Co. He was formerly chief chemist of the Kroger Food Foundation. In his new work he will be responsible for bakery research and bakery sales service programs.

William H. Foster has been elected vice-president of Stokely-Van Camp. He is in charge of the company's West Coast canning operations.

Donald D. Geoffry is new manager of Pacific Brewing & Malting Co. beer plant, San Jose, Calif.

O. J. Harvey has been re-elected president and secretary-manager of the Elfers Citrus Growers Assn., Tampa, Fla.

Bryon Jay has been promoted to director of sales for the Central Western Div. of A & P Food Stores, with headquarters in Detroit.

Harold E. Kavalaris is now grocery products manager for General Mills. His headquarters is in Minneapolis.

Donald **A. Camp** has joined Pennsylvania Salt Mfg. Co.'s sales service organization, industrial chemicals department, with headquarters in Detroit.

Sherman Leonard, food technologist, will be in charge of the University of California's new pilot plant designed for the study of mass scale commercial processing.

Newton B. Lykes has been elected president of Pastel Packing Co. to succeed Wade Emmett Evans, who retains his position as chairman of the board.

John F. McKee has been awarded a Certificate of Merit by the Franklin Institute, Philadelphia for his development of a small lightweight steam trap.

John J. McManus has been appointed comptroller and assistant to the president of Michigan Bean Co., Saginaw, Mich.

Herschel W. McCalley is now personnel manager for Birds Eye-Snider, division of General Foods, with headquarters in N. Y. C.

Nat B. Barclay, president of Snow Crop Marketers, has been elected to the board of the National Assn. of Frozen Food Packers.

John Moe has been named general sales manager for American Home Foods on the West Coast.

Dr. Roy C. Newton, vice-president of research at Swift & Co., has been named to receive the 1952 medal of the Industrial Research Institute, Inc.

Dr. L. D. Parsons was recently named director of research and development for Lever Bros. Co.

A. F. Perrin of Cudahy Packing Co., Omaha, has been elected president of the American Butter Institute.

J. Beveridge Smith has been appointed sales manager of the Diamond Crystal-Colonial Salt Div. of General Foods.

H. W. Durris was recently elected president of the National Pretzel Bakers Institute at its annual convention in Bedford, Pa.

John E. Cashin has been appointed Chicago district sales

S. Charles Segal has taken over the job as general sales manager at Kramer Trenton Co., Trenton, N. J.

Merry Christmas

WE APPRECIATE THE FRIENDLY RELATIONS AND BUSINESS WHICH THE INDUSTRY HAS FAVORED US THE PAST YEAR.

WE EXPRESS SINCERE, GOOD WISHES FOR YOUR HEALTH, HAPPINESS AND PROSPERITY.

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Contact Plate Freezers Inc.
Union City, N.J.
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YOU CAN NEATLY *PACKAGE 2 UNITS PER SECOND!*

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HIGH SPEED WRAPPER

Wraps single or multiple units per package with equal ease and speed — no matter how irregular the shape — how fragile the product.

Your production increases rapidly with the Campbell Wrapper. Dependent upon the product, this amazing machine wraps from 80 to 150 units per minute — *with some users reporting as high as 180!* Highly important, too, it produces a neat, square-cornered package with irresistible sales appeal . . . Labels are accurately spotted and product is not crushed, broken or dented — because it is "float wrapped". In most cases, only one operator to feed and one to pack are required. Machine uses wrap materials of all types, such as glassines, cellophanes, foils, etc., for use with or without stiffeners, as desired. It comes with Straight, L or Hopper type feed.

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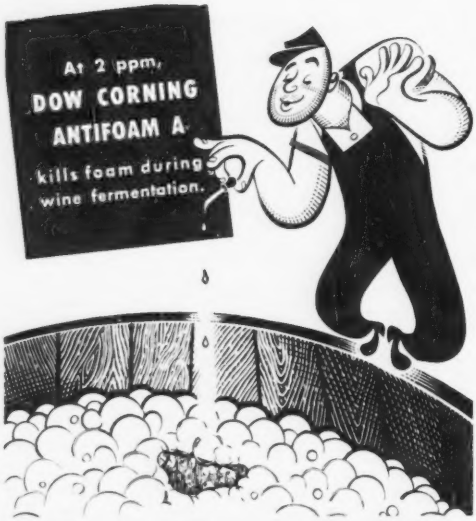

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To get the most out of your process equipment, add a trace of Dow Corning Antifoam A and use the extra space you've been wasting on foam! You'll process most of your most violent foamers, even under vacuum or continuous heat, without waste or hazardous overflow.

That's because Dow Corning Antifoam A kills foam faster and under more varying conditions than any other material known. It is odorless, tasteless and non-toxic; safe to use in food and drugs at concentrations up to 10 parts per million —many times the concentrations normally required to control foams.

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ATLANTA • CHICAGO • CLEVELAND • DALLAS • LOS ANGELES • NEW YORK • WASHINGTON, D. C.

Herschel W. McCalley has been appointed personnel manager of Birds Eye Div., General Foods. He formerly held this post with the company's Ingleheart Div.

representative for FOOD ENGINEERING, replacing Earl L. Newton, resigned.

Charles D. Watson is new sales manager of the Mid-Atlantic region for American Home Foods, Inc. He was formerly Philadelphia district sales manager.

Associated Industries

American Can Co. has opened its seventh Canadian plant, a multi-million dollar manufacturing facility at Chatham, Ontario, Canada. The building covers 185,000 sq. ft. of floor space and has an annual capacity of 300,000,000 cans.

Bemis Bro. Bag Co. recently received an award of excellence in the annual competition of the Society of Associated Industrial Editors for its employee magazine, **Bemistory.**

United States Bag & Mfg. Corp., Mishawaka, Ind., has named John A. de Rosa director of export.

Lear Inc., recently announced the following appointments and promotions: W. Dawkins Espy, chief engineer for the Grand Rapids Div.; George K. Otis, general manager, Lear-Cal Div.; A. H. Endlekoffer, works manager, Grand Rapids plant; A. N. Lawrence, contract division, Grand Rapids; and Richard H. Stewart, quality control manager.

Link-Belt Co. has named Bert L. Pearce, chief engineer at its Ewart plant in Indianapolis, to succeed Charles R. Weyns, retired.

Marley Co., Inc., water-cooling tower and heat exchanger manufacturer, has opened an engineering service office in Washington, D. C. Don Cousins is manager.

Minneapolis-Honeywell Regulator Co. has appointed William H. Fisson power industry manager, with headquarters at Philadelphia.

Morningstar Nicol, Inc., starch, dextrine and adhesive manufacturer, is celebrating its centennial year.

National Can Corp. has consolidated its several sales departments into a single coordinated operation. According to President C. L. Thompson, "the reorganization and streamlining is to the end of strengthening sales effort and giving more effective service to the customers of this company."

Robert Gair Co., Inc., carton manufacturer, has appointed Kenwood Dixon as art director for the company.

General Controls Co., through Vice-President F. J. Wray, has promoted Robert L. Palmer to the position of factory sales engineer.

International Paper Co. recently announced the election of Malcolm G. Chace, Jr. to the board of directors. He succeeds his father Malcolm G. Chace, resigned.

Pacific Cork Industries, Inc., Oakland, Calif. is manufacturing Owens-Corning Fiberglass Corp.'s new frozen food container for distribution in the West Coast area.

Timken Roller Bearing Co. recently announced appointment of George T. Humphrey, Jr., to the post of assistant general manager of the Service Sales Division.

Worthington Pump & Machinery Corp. has appointed H. C. Rasmussen executive engineer at the Wellsville, N. Y. plant.

Deaths

Arthur Stanley Bier, 62, manager of the eastern division of the S & W Fine Foods, Inc., in New York City.—Oct. 23.

Charton C. Frantz, president of the Frantz Co., in Pittsburgh.—Oct. 16.

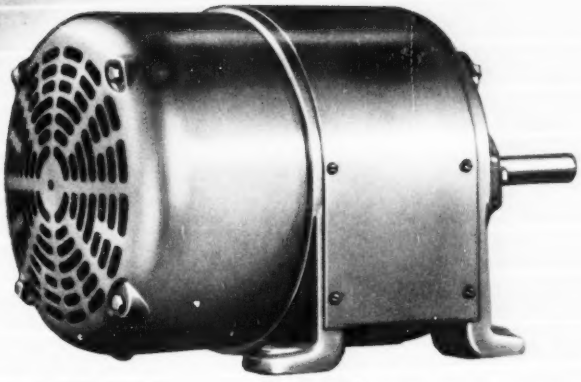
Thomas E. Garry, 65, managing director of the Jersey Ice Cream Co., in Methuen, Mass.—Oct. 11.

Mrs. Georges De Latour 75, president and owner of Beaulieu Vineyard, in Rutherford, Calif.—Oct. 12.

Howard E. Stolt, 35, division traffic manager, Morton Salt Co., in Jersey City, N. J.

CERTIFIED

SAFE



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AND EXPLOSION-PROOF

U.S. MOTORS

100% Safe... U. S. TOTALLY-ENCLOSED MOTORS

Without equal for dependability, this advanced line of motors insures safest power and longest life. The vital elements are given utmost protection against external hazards. The explosion-proof types are certified safe by Underwriters' Laboratories, Inc.

NORMALIZED CASTINGS

All castings normalized to remove internal stresses and maintain original accuracy of bearing settings and air gap between rotor and stator, insuring far longer bearing life.

HI-DRAFT VENTILATION

Ventilating fan is of non-sparking material for explosion-proof motors. Designed with split hub, permitting quick removal. Tight in operation. Multi-bladed for quietness.

LUBRIFLUSH BEARINGS

Self-lubricated for normal life—and with the extra advantage of Lubriflush, permitting relubrication when desired without disturbing the bearings. Fresh lubricant is injected; old grease is purged.

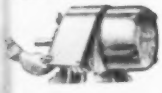
ASBESTOS-PROTECTED WINDINGS

Asbestos protected windings withstand high temperatures and guard against carbonization. Each wire is insulated and isolated with asbestos, to protect against burn-outs & increase motor life.

SPLIT HUB FAN

The propulsion fan forces an air blast against lamination edges, dissipating the heat as fast as it generates—keeping the motor continuously cool. The air is drawn in through end grill.

REMOVABLE COVER

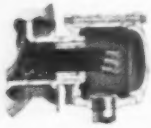


The cover plate can be quickly removed by loosening screws for inspection and to eliminate deposits of dust, dirt, lint, oil and all other accumulations.

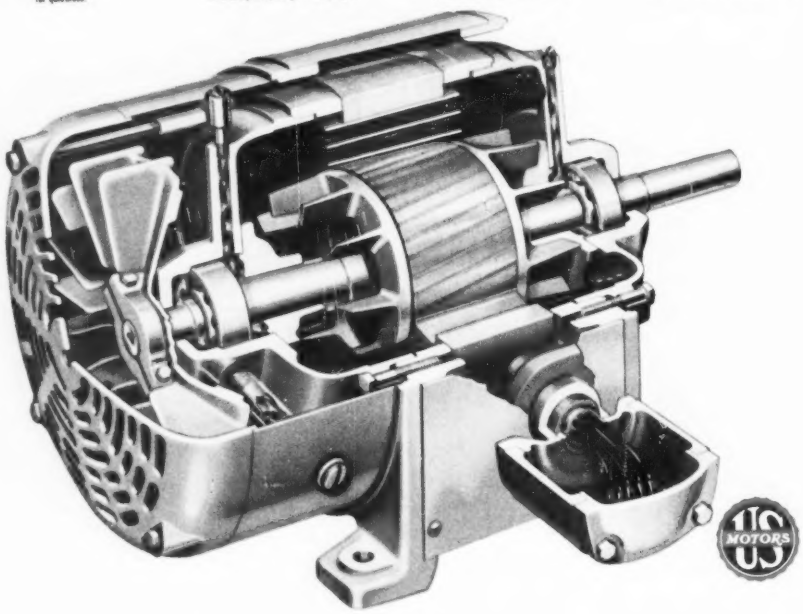
CENTRICAST ROTOR

Centrifugally cast from molten aluminum into a solid, indestructible structure, free of defects.

SEALED TERMINAL



Extra large chamber is sealed with special compound, very high in dielectric strength and with a high melting point.



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Sales and Service offices in all principal cities.

Recent Inventions

Fruit Juice Extractor With Spiral Groove Rotor for Fruit on Periphery and Upwardly Diminishing Pressure-Housing — *A. H. de Rocher, Honolulu, Hawaii.* No. 2,556,996. *June 12, 1951.*

Jelly Made From Solution of Pectin, Sugar and Acid by Placing in Shallow Layer and Evaporating at Temperature Below Solutions Boiling Point Until Melting Point Exceeds 210 deg. F. and Tensile Strength 20G. per Sq. Cm.—*N. J. Hassid, Jerusalem, Palestine.* No. 2,557,050. *June 12, 1951.*

Free-Flowing Dried Food Product Prepared by Dispersing Fatty Ester of Polyhydric Alcohol in Edible Liquid Material of Plant Origin and Drying.—*S. I. Strashun, El Cerrito, Calif., to U. S. A.* No. 2,557,155. *June 19, 1951.*

Preparation for Incorporating in Bread Dough Comprising Hard Fat Particles With Melting Point of 130-160 Deg. F., Particles Being Coated With Calcium Acid Lactate Powder Containing Calcium Sulfate and Corn Starch—*F. F. Hansen, Pittsburgh.* No. 2,557,283. *June 19, 1951.*

Feathers Removed From Poultry at Body Temperature by Forcing Feathers to Expose Skin, Holding, Spraying With Water Below Body Temperature and Picking—*S. S. Barker, Ottumwa, Iowa.* No. 2,557,335. *June 19, 1951.*

Package for Whey Concentrate and Other Dairy Products Consisting of a Rigid Paperboard Cylinder With Internal Resinous Film Bag of Greater Height and Width Than External Container —*N. L. Simmons, Chicago.* No. 2,557,576. *June 19, 1951.*

Sugar Juices Carbonated by Subjecting a Volume of Raw Limed Juice to CO_2, Treating in Successive Steps Additional Volumes of Raw Juice With CO_2 in Presence of Reaction Products—*J. C. Scailles, Paris, France.* No. 2,557,800. *June 19, 1951.*

Process of Treating Sugar Cane Involving Extraction During Crushing With Alkaline Water, Heating, Liming Under Vacuum, Filtering, Repeating Cycle for Second and Third Filtration With Addition of Carbonation—*C. L. Peterson, Salt Lake City, to Peterson Filters & Engineering Co., Salt Lake City.* No. 2,557,996. *June 26, 1951.*

Plasticity of Margarine Permanently Improved by Heating, Cooling and Mechanically Working—*A. D. Wilson, Hornchurch, and H. B. Oakley, Bromborough, England, to Lever Brothers Co., Cambridge, Mass.* No. 2,558,204. *June 26, 1951.*

Apparatus for Processing Fluent Foods Consisting of Tank and Horizontal Shaft Agitator With Radial Disposed Blades Having Slotted Ends Curved in Direction of Rotation—*G. T. Reich, Philadelphia.* No. 2,558,268. *June 26, 1951.*

Producing a Reducing Sugar-Milk Product by Combining Reducing Sugar and Milk Solids to Solids Content in Excess of 25 Percent then Heating Above 212 Deg. F.—*P. F. Sharp, Piedmont, Calif., to Golden State Co., Ltd., San Francisco.* No. 2,558,528. *June 26, 1951.*

Treating Cheese by Wrapping in Air-Impervious, Oil-Resistant, Moisture-proof Wrapper Which Permits Escape of Gas During Curing, Pressing, Removing Wrapper, Dividing and Wrapping, Placing all Wrapped Pieces in Container for Final Curing—*B. F. Davis, Arena, Wis., to Wingfoot Corp., Akron, Ohio.* No. 2,558,673. *June 26, 1951.*

Non-Hygroscopic Solid Sugar Made From Cane Juice by Clarifying, Concentrating, Heating in a Thin Film to Convert to Molten State With No Intervening Crystallization, Solidifying and Grinding—*R. T. Northcutt, Westfield and R. T. Northcutt Jr., Franwood, N. J., to Northcutt Research Foundation, New York.* No. 2,558,775. *July 3, 1951.*

Non-Fermentative Curing of Raw Cacao by Holding at 50-65 Deg. C. for 5-50 Hr. With Moisture Not Less Than 12-15 Percent, Followed by Rapid Drying—*N. W. Kempf, Auburndale, Mass. and H. K. Murer, Summit, N. J., to General Foods Corp., New York.* No. 2,558,854. *July 3, 1951.*

Mechanism for Agitating Potato Chips in Cooking Liquid—*E. V. Wise, Sr., Berwick, Pa., to Wise Potato Chip Co., Berwick, Pa.* No. 2,558,892. *July 3, 1951.*

Apparatus for Continuously Removing Volatile Oils From Citrus Fruit Juices During Evaporation, Including Separator Connected to Condensor to Separate Oil From Water—*J. A. Cross, Westerville, Ohio, to Mojonnier Brothers Co., Chicago.* No. 2,558,933. *July 3, 1951.*

Green Hops Dried Continuously Employing Two Separated High-Pressure Hot Air Streams Traversing the Moving Hops in its Passage Through Two Drying Chambers—*V. A. Bloxham, Berkeley, Calif.* No. 2,559,107. *July 3, 1951.*

Freeze Dehydration of Liquid-Bearing Solids by a Series of Progressively Lower Batch-Freezing Temperatures Followed by Centrifuging Crystals Formed in Each Stage—*E. P. Wenzelberger, Dayton, Ohio, to The Commonwealth Engineering Co., Dayton.* No. 2,559,204. *July 3, 1951.*

Low Methoxy Acid Pectinate Jelly Composition—*W. E. Barch, New York to Standard Brands Inc.* No. 2,559,338. *July 3, 1951.*

Fresh Vegetable Material Pressed to Expel Juice, Juice-Protein Coagulated by Acidulation and Heated to Form Edible Product —*D. D. Peebles, Hillsborough, P. D. Clary Jr., Petaluma, and R. K. Meade, Santa Rosa, Calif., to Western Condensing Co., San Francisco.* No. 2,559,459. *July 3, 1951.*

Process for Producing Fine Dry Gluten Which is Easily Dispersed From Washed Starch-Free Wet Agglomerates—*H. M. Weber, Trenton, Mich., to Trenton Chemical Co.* No. 2,559,551. *July 3, 1951.*

Stabilizing Foam of Malt Beverages by Removing Foam-Inhibiting By-Products With Organic Solvent and Adding Resultant Product to Beverage—*H. H. Geller, Milwaukee.* No. 2,559,612. *July 10, 1951.*

Grain Drying Means for Vertical Storage Bin Comprising Screen-Covered Air Channels in Base Connected to Drum and Exhaust Fan—*J. F. Tipps, Memphis.* No. 2,560,141. *July 10, 1951.*

Re-utilization of Beet Sugar Diffusion Waste Water by Chlorinating and Adjusting pH to 5-7, Separating Solid Matter and Reintroducing Into Diffusion Process —*E. A. Pearson, Bothell, Wash., to Sugar Research Corp., New York.* No. 2,560,125. *July 10, 1951.*

De-mineralization of Sucrose Solutions by Contact With Cation Exchange Cell Activated With Ammonium Ions and Anion Exchange Cell Hydroxly Activated—*H. M. Day, Cos Cob, and A. C. Wrotnowski, Jr., Greenwich, Conn., to American Cyanamid Co., New York.* No. 2,560,504. *July 10, 1951.*

Wheat Tempered by Subjecting to Steam at Sub-Atmospheric Pressure, Increasing Steam Pressure, Applying Water to Surface, Subjecting Grain to Increased Vacuum and Supplying Atmospheric Air Thereto—*B. R. Warner, Chicago, to Guardite Corp.* No. 2,560,615. *July 17, 1951.*

Want more information on any of these recent patents? If so, you may obtain detailed printed copies by writing direct to the U. S. Patent Office, Washington, D. C., giving serial numbers of those you want and enclosing 25c for each copy.

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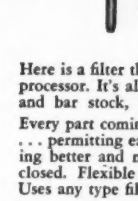

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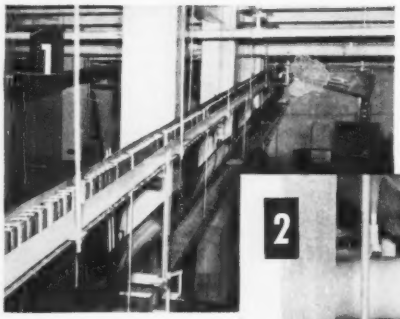
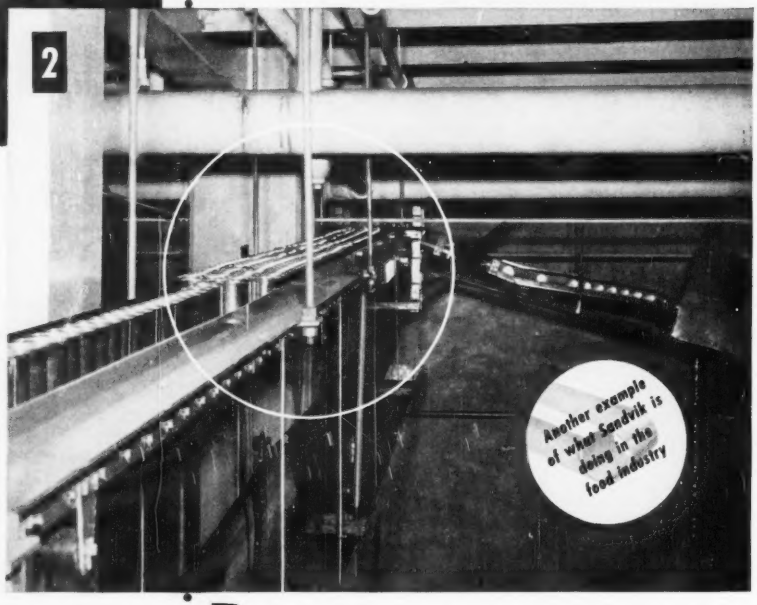
Easier-Sliding Simplifies Can Handling On This SANDVIK STEEL-BELT CONVEYOR





SS-71

Can You Improve Your Food Handling Operation With A Sandvik Steel-Belt Conveyor?

In addition to can conveyors, Sandvik supplies steel-belt units for handling a wide variety of foods, in various stages of preparation. These include meat, fish, vegetables, fruits, sugar, bakery products (on bake oven bands), margarine, candy, etc.

Why not look over your operation. See if there might be a place where the easy-to-keep sterile surface of a solid, stainless or carbon steel band could save money or step up production. Then, ask Sandvik for their engineering help and advice.

Sandvik builds complete conveyors to fit specific applications and provides engineering service to insure satisfactory operation. Belts can be of any length or width.

Write, wire or phone for further information.

SANDVIK STEEL, INC.

Conveyor Division

111 EIGHTH AVE., N.Y. 11, N.Y., WAtkins 9-7180

Manufacturers of steel-belt conveyors for over thirty years.

1 Here are cans of Hershey's chocolate syrup carried by a Sandvik steel-belt conveyor. Normally, they move in single file to the take-off point.

2 But, when there's a delay... the cans keep coming, close ranks, form a column of four and mark time... with the smooth, Sandvik belt sliding easily under them until the take-off operation catches up. At times, there are four can columns, 60 feet long, marking time on the moving belt.

The smooth, low-friction surface of the solid steel band gives a Sandvik conveyor a special advantage for handling cans. They can be very easily slide-handled as they ride on the moving belt. This facilitates automatic storage en route and simple, slide-off discharge at any point with a minimum of belt wear. When extra "slide-ability" is required, the surface of the band can be lubricated.

SANDVIK STEEL BELT CONVEYORS

Just Off the Press

New Catalogs and Bulletins
from manufacturers of equipment and supplies
—For Free Copies, Use Reader Service—

Food Plant Equipment

Can Washer

Motor-driven rotary turntable divided into five compartments, each holding one can and cover, is the subject of 4-page bulletin I-1066. Photo-diagrams are included.—*The Creamery Package Mfg. Co., 1243 W. Washington Blvd., Chicago 7.*

Mills & Mixers

Described in Catalog GG-51 is line of 1-point control and 4-point control roller mills, three-zone action colloid mills, and angular mixers. 8 pages.—*Troy Engine & Machine Co., Troy, N. Y.*

Brewing Instruments

Application of temperature recording and controlling instruments in the brewhouse to enable the master brewer to maintain close supervision of the process is detailed in Instrumentation Data Sheet No. 3.1-1. 4 pages.—*Minneapolis-Honeywell Regulator Co., Brown Instrument Div., Philadelphia 44.*

Meat Packers' Instruments

Divided into two sections, 26-page bulletin features flowsheet illustrating the steps in processing meats and at the same time indicating different types of instruments generally used in each application. Schematic drawings show operation of different control systems—smokehouses, hot water, scalding tanks, etc. Instrument section lists units most applicable to the engineered controlled systems.—*Taylor Instrument Companies, Rochester 1, N. Y.*

Electro-Mechanical Selector

Leaflet briefly describes machine designed for the photoelectric color selection of a wide variety of products, including peas, beans, coffee beans, cocoa beans, nut kernels, and others. Unit contains no electric motors, no fast-moving parts, no high voltages.—*Creighton & Partners, Ltd., London, England.*

Bulk Sterilizer

New features in line of sterilizers include a welded construction, corrosion-resistant nickel-clad chamber shell, and a new control which permits one-point automatic control of the sterilizing cycle. Catalog, 16 pages, pictures and briefly describes various units.—*American Sterilizer Co., Erie, Pa.*

Proportioning Equipment, Scales

Featured in fold-out Bulletin 0450 are proportioning and blending equipment, packing equipment, and bulk and bagging scales for both liquids and solids. Scale types corresponding to materials are listed.—*Richardson Scale Co., Clifton, N. J.*

Control Equipment

Linear Transducers

Data folder describes and illustrates differential transformers used for measurements of motion from a few micro-inches up to 5 in. as required. Unit will generate an a.c. voltage signal which is directly proportional to the position of its armature from the electrical center of the transformer wiring, and will achieve a linearity of .01 percent.—*Automatic Temperature Control Co., Inc., 5200 Pulaski Ave., Philadelphia 44.*

Electronic Tubes

Furnished in 28-page booklet, with types, price lists and illustrations, are complete technical specifications and information on hundreds of special-purpose electronic tubes.—*Milo Radio & Electronics Corp., 200 Greenwich St., New York 7.*

Check Valve

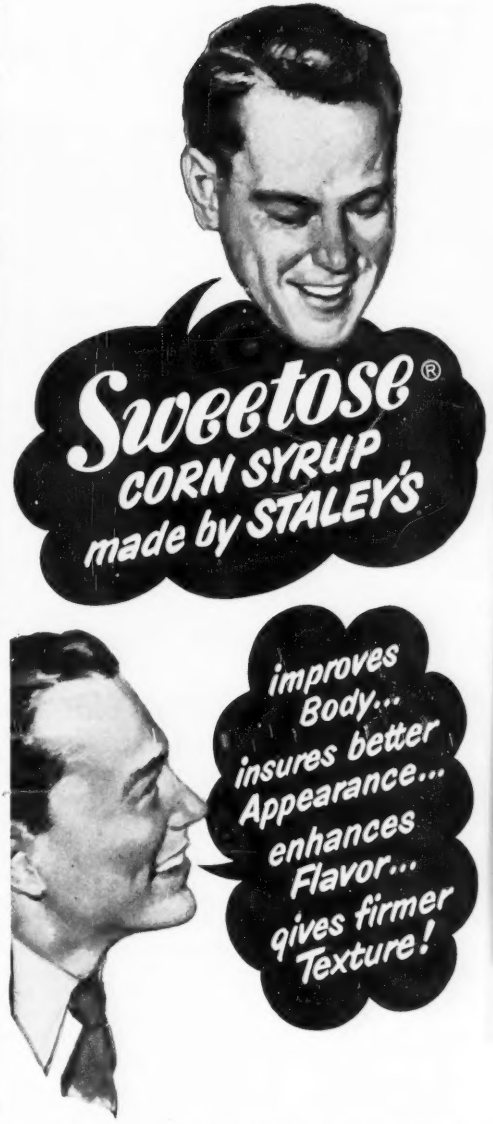
Designed to prevent water hammer, valves presented in 4-page bulletin are reported to eliminate pressure failures which can result in damage to pipes, valves, liquids and other parts of piping systems. Technical data, cutaway version of two types of valves, and a series of installation photos are included.—*The Williams Gage Co., 1620 Pennsylvania Ave., Pittsburgh 33.*

Water Columns and Gages

Bulletin WG-1811 cites features of flat glass high-pressure water gages, also gives water column details, and covers typical high-pressure column gage units.—*Yarnall-Waring Co., Philadelphia 18.*

Potentiometers

Characteristics of Measuring Circuit Used in Brown Electronic Potentiometers is title of 16-page Bulletin E15-13. Material is for benefit of users who wish to apply potentiometers to unique or spe-



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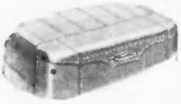
NEW TRAILMOBILE Model "A" Quarter Panels Can Take Severe Blows from Overhanging Trees Without Costly Damage!



Trees overhanging the highways in small towns are a hazard that drivers often can't avoid. But the constant banging of trees need *not* cause ugly, expensive-to-repair quarter panel "washboarding"—not if you are pulling a new TRAILMOBILE Model "A"!

TRAILMOBILE'S new, one-piece extruded aluminum quarter panels can take tremendous blows without denting or distorting. Seamless, with integral drip moldings, they stay water and weather resistant! You keep your service and maintenance costs down . . . you bring profitable hauling capacity up—when you switch to TRAILMOBILES as more and more profit-wise operators are doing!

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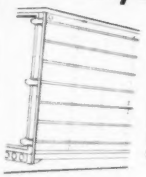

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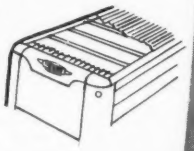
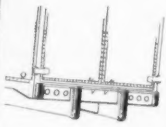
New steel roof bows have 60% greater resistance to deflection. Full 1" crown to roof gives positive water draining action.





New "self-protecting" rear end

Reinforced steel bumpers at the center and ends give added protection against docking damage. Recessing lighting and reflector system cuts maintenance costs.

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cialized measurements, such as those frequently encountered in scientific and technical investigations. — *Minneapolis-Honeywell Regulator Co., Brown Instrument Div., Philadelphia 44.*

Load Cells

Description and application of torsion bar load cells and cantilever beam load cells for measuring force in tension or compression, thrust, torque, and weighing, is given in data sheets 62 and 65. Operation features, range data, wiring diagrams and case dimensions are included.—*Automatic Temperature Control Co., Inc., 5200 Pulaski Ave., Philadelphia 44.*

Blow-Off Valves

Surface blow, bottom blow-off, and water-column blow-off valves and connections are presented in catalog.—*Everlasting Valve Co., 49 Fifth St., Union City, N. J.*

Colorimeters

Interference-filter color meters for the measurement of color and vegetable oils are described in 8-vegetable oils are described in Bulletin No. 495. — *Photovolt York 16.*

Materials Handling

Tractor-Shovel

Features of tractor-shovel detailed in Catalog 208 are full-reversing transmission, operator visibility and safety, full-hydraulic bucket control, and power booster steering.—*Frank G. Hough Co., 835 Seventh St., Libertyville, Ill.*

Hand Trucks

Condensed 12-page catalog specifies line of 2- and 4-wheel hand trucks, trailer trucks, dollies, lift jack systems, wheels, casters, and molded-on rubber-tired wheels.—*The Howe Scale Co., Rutland, Vt.*

Conveyors

Articles include in Vol. 198 of house organ, "Conveyor", cite applications of conveyors for brewery and bottle plants, also, conveying-elevating of dextrine and starch, flour mixes, and macaroni. —*Stephens-Adamson Mfg. Co., Aurora, Ill.*

Fork Trucks

New 2,000-lb. fork truck is outlined with dimensions and specifications in Bulletin 1327.—*The Baker-Raulang Co., Cleveland 2.*

Electric Trucks, Tractors

Set forth in Bulletin 5191 are electrical industrial trucks and tractors, including electric high-lift fork trucks of both "rider" and "walkie" types, electric high-lift platform trucks, electric lift trucks for skips and pallets, electric tractors, and electric and hydraulic hand lift trucks.—*Barrett-Craven Co., 4609 S. Western Blvd., Chicago 9.*

Chain Drive, Conveyors

Digest-type booklet gives installation, operation, and maintenance data on various type conveyors. Diagrams and photos are included.—*Chain Belt Co., 1600 W. Spruce St., Milwaukee 4.*

Plant Supplies

Plastic Mold Steel

Spiral type booklet offers tips on the selection, application and heat treatment of steel for plastic molding. Other information includes solutions to problems encountered in plastic tooling, how to select a mold steel to obtain better results, and lower molding cost. In addition, booklet contains a selector table giving in brief form the application of mold steel.—*Carpenter Steel Co., Reading, Pa.*

Receiver-Type Purifier

For removing destructive entrainments from vapor lines, purifier, described in leaflet, claims chief advantages of low initial cost, no moving parts, self-cleaning action, and careful fluid dynamic designing which provides for handling extreme velocities at high efficiencies and reduces pressure drop to a minimum. 4 pages. —*The V. D. Anderson Co., 1935 West 96th St., Cleveland 2.*

Steam Cleaner

Catalog 50 gives brief account of difference between the steam vapor and heavy-duty model steam cleaning unit, suggests best fit for each model, and contains a chart of pressures, capacities and temperature. Also, there is list of standard accessories. 4 pages.—*Malsbary Mfg. Co., 845—92nd Ave., Oakland 3, Calif.*

Boilers

Advantages for oil or gas firing 125-lb. working pressure boilers are cited in 4-page catalog 99. Specially accented are quick assembly, easy access for cleaning, and minimum headroom.—*Kewanee Boiler Corp., Kewanee, Ill.*

Asbestos Fabric Packing

Line of asbestos packing is illustrated and briefly detailed in 4-page leaflet.—*Raybestos-Manhattan, Inc., Packing Div., Manheim, Pa.*

Vacuum Attachment

Developed to eliminate sweeping of floors during polishing, steel-wooling and sanding operations, is attachment which connects to maker's standard floor machine. Text covers operation of unit, describing how it draws particles into a bag to banish "after-sweeping". 2 pages.—

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is
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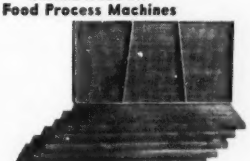

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Alloy Rods

Available are five bulletins covering line of hard-facing alloy rods—e.g., tunsten-carbide rod for electric or acetylene application, a fabricated rod containing alloys in a tube and coated with a high alloy coating designed to resist abrasion and able to withstand severe impact, and coiled hard casing rod for automatic application and others.—*Victor Equipment Co., San Francisco 7.*

Vacuum Machines

Applications of industrial vacuum systems, featured in promotion sheet, include handling of hot materials, picking up of liquids, and removing minute particles of dust from finished products. Unit reclaims metals, cleans the plant floors, ceilings, walls and pipes.—*Spencer Turbine Co., Hartford 6, Conn.*

Vaporizers

Vertical and horizontal type vaporizers for indirect heating of processes from 250 to 650 deg. F. are subjects of 4-page leaflet. Gas- and oil-fired boilers for processed steam are also covered. Output, floor space, height and width data are listed.—*Eclipse Fuel Engineering Co., Rockford, Ill.*

Plastic Products

Outline of plastic items is given in 4-page pamph'et. Bottles, jars, safety jugs, valves, and acid tank liners, are a few of the articles listed.—*American Agile Corp., Plastics Div., 5806 Hough Ave., Cleveland 3.*

Unit Heater Trap

Guide to se'ection of steam traps for unit heaters by the Btu. method and condensate method includes trap selection for heaters operated at constant and variable pressures, manufacturer's Btu. output rating for 30 makes of heaters, recommended installation practice, and physical data and list prices of traps. 16 pages. —*Armstrong Machine Works, Three Rivers, Mich.*

Drum Cleaner

Including photos, line drawings, and plan and elevation drawings, catalog explains how drum cleaning can be effected by throwing metallic abrasives against drum surfaces by centrifugal force. How machines are loaded and unloaded, safeguards for the operator, and engineering specifications are also given.—*Pangborn Corp., Hagerstown, Md.*

Enclosed Motor

Construction details of totally enclosed fan-cooled motor are presented in a foldout leaflet. Termed suitable for use where there is dust, dirt, etc., motor is reported easily cleaned due to elimination of internal air passages and pockets.—*Allis-Chalmers Mfg. Co., Milwaukee 1.*

Spectrophotometer

A combination of an optical spectrophotometer and electronic indicating device, new unit produces curves instantaneously on the face of a cathode ray tube. Instrument will handle transparent solid or liquid samples up to 100 mm. thick. Also, by means of a separate reflection attachment, it will produce data from opaque solids or powders.—*American Optical Co., Buffalo 15, N. Y.*

Rodenticide

Attractive booklet of 16 pages presents information on Warfarin concentrate for controlling rats and mice. Chemistry, killing action, and handling risks are discussed.—*Patterson Drug & Chemical Co., Inc., 110 William St., New York 38.*

Miscellaneous

Daylight Blacklight

Brochure sets forth various features of portable single-unit ultraviolet generator, fluorescent tester, and comparator combined. Specified are materials and design details which permit unit to be used in broad daylight. Four types are cataloged.—*Menlo Research Laboratories, Box 522, Menlo Park, Calif.*

Pallet Box Handling

Booklet suggests three ways pallet boxes may be used to cut costs in handling, storing or shipping of material. Included is story of how design engineer can reduce shipping weight and packing time.—*General Box Co., Chicago.*

Aluminum Bronze Alloy

Corrosion-erosion resistance and cavitation-pitting data, along with physical and chemical properties of various aluminum bronze alloys recommended for such service, are furnished in 20-page bulletin CI-3.—*Ampco Metal, Inc., 1745 South 38th St., Milwaukee 46.*

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Any of these very-latest catalogs, bulletins, or folders will be sped to you gratis. Just note here the specific literature you want, then turn to the Reader Service section inside the back cover, where all items are listed by pages under the heading, "Editorial: New Technical Literature" —each one with a page key number after it. The key numbers also appear on the handy Reader Service postcard. So you circle those for the items desired, sign at the bottom and mail. No postage needed.

Here's the new Hamilton Tilting Type Mix-Cooker which has every feature of the regular Tilting Kettle PLUS the added feature of a bottom draw-off valve. Products being cooked can be drained off either through rim lip or through bottom valve, depending on viscosity of product.

The steam jacket on this Hamilton Tilting Kettle covers ⅔ of kettle area. Fabricated in stainless steel in gauges required by ASME Code or heavier. This kettle is available with single or double motion agitator with maple or nickel alloy scrapers—plus a Hydraulically lifted agitator arm. Any combination available upon specification.

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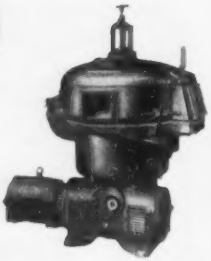

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POSITION WANTED & INDIVIDUAL SELLING OPPORTUNITY undisplayed advertising rate is one-half of above rate, payable in advance.

PROPOSALS, $1.20 a line an insertion

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EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style

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The advertising rate is $11.50 per inch for all advertising appearing on other than a contract basis. Contract rates on request.

AN ADVERTISING INCH is measured ⅛ inch vertically on one column, 3 columns—30 inches—to a page F.I

NEW ADVERTISEMENTS received by 10 A. M. December 20th at the New York Office, 330 W. 42nd St., New York 36, N. Y., will appear in the January issue subject to limitations of space available

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

WANTED FOOD Chemist Bakers Supplies. Thorough knowledge of preserves, fillings, flavors, etc. Can develop & duplicate. Ability to manage department—analyze costs. Excellent opportunity old established firm. Only experienced men need apply. P-2649, Food Engineering.

WAREHOUSE SPECIALIST. Permanent position to supervise warehousing, labeling and packaging methods, traveling to several plants in the Middle West. Please furnish resume of qualifications, stating salary desired. P-2613, Food Engineering.

SELLING OPPORTUNITY OFFERED

MANUFACTURERS AGENT. Some exclusive territories available. "Ronningen" quick coupling non-short-circuiting water filters. 50 to 5000 GPM. Pressures to 200#. Excellent opportunity for engineering salesman handling pumping machinery or heavy industrial equipment. Liberal commission basis. Ronningen Mfg. Co., Vicksburg, Michigan.

EMPLOYMENT SERVICE

SALARIED PERSONNEL $3,000-$25,000. This confidential service, established 1927, is geared to needs of high grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Jira Thayer Jennings, Dept. F, 241 Orange St., New Haven, Conn.

POSITIONS WANTED

BIOCHEMIST-PRODUCTION Manager, 3 years experience manufacturing mayonnaise, dressings, peanut butter, syrups, flavorings. Trained in all phases of operating a food plant. Married, 28. Now employed, but desire re-location in East. PW-2525, Food Engineering.

CODFISH AND Chicken patties cans, pickles, wine and oysters, etc. 20 yrs. experience. PW-2479, Food Engineering.

FOOD TECHNOLOGIST, B.S. recent graduate, seeks position with progressive concern. Willing to travel. PW-2518, Food Engineering.

FOOD TECHNOLOGIST—Control, Development, Production. Experience covers wide range food products including preserves, bakery, candy, peanuts, olives, etc. Relocate anywhere for challenging, responsible job. Ten years with present employer. PW-2654, Food Engineering.

FORMER GOVERNMENT food and drug inspector with bacteriology education seeks position with food or drug industry or consulting agency. PW-2655, Food Engineering.

SELLING OPPORTUNITY WANTED

SALES REPRESENTATIVE covering Minnesota and the Dakotas, seeks line of Merit. SA-2495, Food Engineering.

PATENTS

CONSULT: Z. H. POLACHEK,
Reg. Patent Attorney, 1234 Broadway, New York 1, N. Y.

PERSONNEL FOR THE FOOD INDUSTRY
Employers Should Have Some Benefits Too!

With that in mind busy food executives find that my files are invaluable to them when they consult me for that particular expert they want.

Your requests for personnel are given careful and interested attention. Applicants are only submitted on the strength of their proved worth and investigated background.

JOHN MC CLOUD
Oregon 5-8260
Qualified Employment Agency
140 West 42nd St. (suite 400) N. Y. C

FOUNTAIN SUPPLIES
CRUSHED FRUITS, SYRUPS
Wanted

Experienced working foreman who can formulate and produce quality line of Ice Cream and Fountain Supplies. Location New York City. Our company is well known for many years as Food Processor of related lines and plans now to add Fountain Supplies to its production program. Replies will be kept confidential and should include complete resume of personal qualifications and experience, also salary expected.

P-2439, Food Engineering
330 W. 42 St., New York 36, N. Y.

DESIGN ENGINEER

Food Machinery Engineer (Age about 35) wanted for design and development on filling machine and allied lines. Previous experience in similar work required. Program of expansion with well-known manufacturer offers opportunity for responsibility and exercise of creative ability. Company has excellent program of employee benefits. Submit resume of experience to:

P-2489, Food Engineering
330 W. 42 St., New York 36, N. Y.

CHERRIES
MARASCHINO—GLACE

Old established Canadian firm entering Candied Fruit field wishes to employ or consult expert with recent thorough technical experience in these products. Replies treated in absolute confidence.

P-2403, Food Engineering
330 W. 42 St., New York 36, N. Y.

UNUSUAL OPPORTUNITIES
can be found each month
in the
SEARCHLIGHT SECTION

FOOD CHEMISTS
JR. AND SENIOR

NUTRITIONIST Ph.D., expert.....to. $15000
"Formula" feeds as against "unmixed".
Good personality.
CHEMIST—some "chocolate" exp.....$ 5000
Call, write or wire:—Gladys Hunting (Consultant)
DRAKE PERSONNEL
7 W. Madison St. Chicago 2, Ill.

FOR SALE:

Food manufacturing and distributing business in middle west. We are retiring from business after approximately 25 years, with a sales volume of $350,000.00 per year. Can sell to suit your terms.

BO-2426, Food Engineering
520 N. Michigan Ave., Chicago 11, Ill.

Quick Freezing Facilities Available

November 1 to June 1 each year. We can prepare, package, quick freeze and store your product at very moderate rates. Up to 10 tons daily. Experienced personnel. Located midway between New York and Chicago. Excellent transportation facilities.

CW-2412, Food Engineering
330 W. 42 St., New York 36, N. Y.

SCHOOLS

COURSES IN FOOD TECHNOLOGY

a. Mathematics and Chemistry of Food Technology
b. Food Analysis
c. Nutrition
d. Canning
e. Freezing
f. Preserving
g. Inspection and Grading according to USDA standards
h. Mold Counting and Insect Examination

RESTAURANT MANAGEMENT
GENERAL STUDY OF COOKING
PREPARATION OF SALADS
PIE AND PASTRY MAKING
CAKE DECORATING
STUDY OF MEATS

MEN OR WOMEN
VETERANS OR NON-VETERANS
DAY AND NIGHT CLASSES

Highly qualified instructors with practical experience as well as European and American degrees in their respective fields.

ATTENTION EMPLOYERS

If you need qualified personnel, such as: Food Technologists, Laboratory Technicians, Mold Counters, Foremen, Forelades, Graders and other trained personnel for Quality Control Work please contact the Employment Office of the school.

MIAMI SCHOOL FOR FOOD PROCESSING SPECIALISTS
Box 383 CORAL GABLES 34, FLORIDA
Telephone: 83-7301

Complete Plants FOR SALE

Juice and Fruit Packing
Vegetable Processing
Potato and Chip Plant
Frozen Food Processing
Preserves and Syrups
Brewery—Distillery—Winery
Margarine—Lard—Shortening
Peanut Butter—Mustard
Pickles, Salad Dressing
Meat—Dog Food—Poultry
Oil Solvent—Extraction
Fish Processing—Canning
Cheese and Spices
Candy—Chewing Gum
Macaroni—Spaghetti
Coffee Roasting—Packing

Trade in your old equipment for needed machinery; convert your surplus into cash . . . put them back to work where needed for defense.

FMC

THIS IS THE TIME TO SELL BUY OR TRADE EQUIPMENT

Mixing
New and used Double Ribbon Mixers from 200 lb. to 3000 lb.
Dough Mixers, jacketed and unjacketed; single and double arm in all wanted sizes
Vertical Mixers, jacketed and unjacketed for every purpose
Philadelphia 2 Speed Reduction Drives: ratio 20:1

Colloid Mills, Homogenizers Viscolizers
Eppenbach, Premier, Bartlett-Snow, Cherry-Burrell, Charlotte, Manton - Gaulin, Case, Union, Marco from fractional horse power to 50 H.P.

Mills, Cutters, Choppers, Slicers
Hammermills for pulverizing and grinding, H.P. to 100 H.P. of standard makes
Roller Mills for grinding pastes, nut meats, grains, cereals and other materials
Dicers, Slicers, Choppers by Urschel, Sterling, Anderson, others

Pulpers, Juice Extractors
Langsenkamp, stainless steel EZ-Adjust Model B Pulpers
Chisholm Ryder Model F Stainless Juice Extractors
Indiana Stainless and Monel Brush Finisher
Mt. Gilead Hydraulic Fruit Press: 24" x 24" with hydraulic pump, motor; self contained unit

Dryers, Dehydrators Flakers
Devine, Buffalo and Stokes Cabinet and Shelf Dryers for use with steam, gas, electricity — with or without vacuum
Rotary Drum Dryers some in stainless, nickel, steel; cored drums for heating or cooling; various sizes available
Procter and Schwartz continuous type Apron Dryers

Retorts, Sterilizers
Standard FMC and Berlin Chapman retorts; 40" x 60" and 42" x 72" also 42" x 96" vertical and horizontal
4 Horizontal Retorts 5' x 14' with tracks, capstan reposing doors
Stymax Sterilizer; rectangular 42" x 48" x 8' steam jacketed

Filling Equipment
Syphon Fillers, straight Line and Rotary for light, easy flowing liquids
Vacuum Fillers for materials of medium and heavy viscosity; semi automatic and full automatic . . . straight line and rotary
2 Horix Stainless Steel Gravity-Vacuum Fillers, 14 stem
Filler Machine Co. and Elgin Piston type Fillers from 1 to 11 Snouts
Food Machinery Corp. Can Fillers for Soups, Pea and Bean, Corn, etc.
Stokes and Smith and other standard make auger type fillers for powdered and granular material

Labelers
Semi Automatic spot Labelers by New Jersey, World, Ermold, National
Fully Automatic Labelers by World, Pneumatic Scale, New Jersey
Wrap around Can labelers by Standard Knapp, Burt, Kyler, Nu-Way, etc.

Packaging Equipment
Top and Bottom Carton Fillers and Sealers . . . complete packaging lines by Package Machinery Co. . . . Pneumatic Scale Co., Ceco, etc.
Standard Knapp, Bliss, Ferguson Automatic Top and Bottom Case Sealers

FIRST MACHINERY CORP.

157 HUDSON ST. | WOrth 4-5900 | NEW YORK 13, N. Y.

WANTED

TO EXPEDITE PRODUCTION

Food Processing Equipment including Aluminum and S/S Kettles, Mixers, Vacuum Pins, Dehydration equipment, Grinders, Elevators, Stills, Colloid Mills, Conveyors, Filters, Packaging Units, Wrapping Machines. Will consider a set up plant now operating or shut down. When offering give full particulars.

P. O. Box 1351,
Church Street Sta., New York 8, N. Y.

PISTON FILLER

Simplex, Single cylinder, 16 oz. max., fills 40 per min. This machine is in perfect condition, factory reconditioned Oct. 1951. Asking $350 FOB S.F.

BABY FORMULAS
1798 Filbert St. San Francisco 23, Calif.

FOR SALE

500 gal. S.S. Mix Tank, water jkt., 60"x44".
2000 gal. S.S. Truck Tanks and Trailers.
100 gal. S.S. Clad Jkt. Kettles, 30"x52".
150 gal. S.S. Jkt. Kettle, 42"x34", agit.
100 to 250 gal. S.S. Mix Tanks, water jkt.
300 to 4000 gal. Glass Lined Tanks.
Colloid Mills, 7½ and 15 H.P.
Model 1SH Mikro Pulverizer, 5 H.P.
75 to 1500 gal. Homogenizers or Viscolizers.
Model 148C Stokes High Vacuum Pump, 1½ H.P.
Ingersoll-Rand Centrifugal Pumps, 5 & 7½ H.P.
28"x60" to 42"x120" Double Drum Dryers.
Hobart Grinder, 1½ H.P.
Day Vibrating Screen, 40"x104", 1 H.P.
12x6 Chicago Pneumatic Vacuum Pump, 5 H.P.
3 ft. to 6 ft. Copper Vacuum Pans.
Milk Past., Coolers, Fillers, Washers, etc.

Send us your inquiries

LESTER KEHOE MACHINERY CORP.
1 East 42nd Street, New York 17, N. Y.
Murray Hill 2-4616

FOR SALE

ONE HOBART MIXER, MODEL T-280
ONE HOBART MIXER, MODEL M-280

Complete with 80 and 100 quart bowls and whips. Run only 10 hours after being rebuilt by Hobart.

FS-2509, Food Engineering
330 W. 42 St., New York 36, N. Y.

FOOD PLANT WANTED

We are now manufacturing over $20,000,000 in various lines and wish to expand by acquisition of assets or stock of one of more industrial companies. In our negotiations the sellers' problems and wishes will receive full consideration. Present personnel will normally be retained.

Address all replies
"Confidential" C. J. GALE, Sec.
233 Broadway, N. Y. 7, N. Y. BA 7-1819

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Anything you want
that other readers of this paper can supply

OR—

Something you *don't want*
that other readers can use, advertise it in the
Searchlight Section

THRIFTY BUYS

FOR IMMEDIATE DELIVERY

2 Case S.S. Emulsifiers, Complete With Pump & Motor
Sprague Sells 6 Spout S.S. Filler, Model #60, Fills From #1 to #10 Containers
Day 2000# Mixer, with Day #31 Sifter & Automatic Unloader with Motors
Day 1000# Jktd. Mixer, with Day #31 Sifter, with Motors
Elgin S.S. Piston Fillers, one & two Pistons
Lehman 5 Roll 12"x35" Cored Refiner.
2 S.S. Model D Fitz Mills, 5 & 7½ HP
Island Equipment Unscrambler, Like New

For BETTER BUYS & Service
Phone SOuth 8-4451—9264—6782
You Can BANK on

EQUIPMENT CLEARING HOUSE, INC.
289-10th ST. BKLYN 15, N. Y.

—FOR SALE—

1—Sharples Stainless Steel Super D Canter.
1—Bird Stainless Steel Solid Bowl Filter, 18" x 28".
1—Vallez #49 Filter, 738 sq. ft.
1—Sperry Heresite Covered Filter Press, 36" x 36", 4 eye, closed delivery, 17 chambers.
1—Read Stainless Steel Double Arm Jacketed Mixer, 225 gals. cap., with Sigma Blades.
2—Orville Simpson #41 Rotex Screens.
6—Type 316 Stainless Steel Storage Tanks, 1500 gals. cap. each.
4—Type 316 Stainless Steel Storage Tanks, 11,000 gals. cap. each.
1—Steel Storage Tank, 12,000 gals. cap.

R. GELB & SONS, INC.
Est. 1886 UNionville 2-4900
UNION, N. J.

Season's Greetings

THE "CONSOLIDATED" GIFT TO ALL INDUSTRY:

IMMEDIATE DELIVERY

3—42" All Stainless Steel Centrifugals, Amer. T.&M. Co., each with s/s basket, curb, casing, shaft, unloader and 40 H.P. variable speed Slip Ring 3/60/400 v. 1200 rpm. motor with full controls. Suspended bottom discharge type. Now at Newark.

1—6'x50' Louisville welded shell Rotary Steam Tube Dryer, 2 rows, 54 tubes.

8—Oliver Vacuum Filters, incl. 8x12', 11'6x14', 11'6x18'.

8—8'x12' All Stainless Steel Feinc Rotary Continuous Vacuum Filter, string discharge, with blankets and Stainless Steel trough, repulper, receivers, vacuum pump, motors, reducers, etc. Shop #387.

1—4'x30' Stainless Steel lined Rotary Dryer, reducer and 10 H.P. motor.

1—18"x28" Bird Continuous Centrifugal Stainless Steel, copper housing, with 10 H.P. motor.

4—Swenson-Walker Jacketed Crystallizers in 10' sections, (1—70' lo. and 3—80' lo. each with pulley driven gear reducer, 10 H.P. A.C. motor). Units 24" I.D. x 26" high, with 3/8" steel plate and 1/4" steel jackets, steel covers, ribbon agitators.

1—H.P.M. Co. 500 Ton Curb Press, 24"x36" curb, with steam pump.

1—Mechanical 5'x16' jacketed Cooker or Dryer.

3—Steel 9500 gal. closed jacketed agitated Kettles.

1—400 gal. open s/s jacketed Kettle, 100# jacket pressure.

2—Rotex Sifters, 40x84"; #11 20x48"; Day #71 Stainless Steel "Roball" Sifters, single deck, 40"x84, with 2 HP, 3/60/220 volt motors.

2—Mikro Pulverizers, #1 with 7½ H.P. motor and #2 Type 2W.

6—Mixing Tanks; 10'x7', with steam coils and agitators.

1—30"x30" Aluminum Filter Press; 45 chambers; 1" cake, side feed, open delivery, non-wash. Used on pectin.

4—100 Gal. Jacketed Aluminum Kettles; 2—125 Gal.

1—24" x 24" Plate and Frame Aluminum Filter Press, 24 Chambers.

Only A Partial List

CONSOLIDATED
PRODUCTS CO., INC.
13-17 PARK ROW
NEW YORK 38, N. Y.
BArclay 7-0600

LIQUIDATING FORMER

Scottish American Distillery
Foot of Alexander St., Peoria, Ill.

Distillation and processing equipment; grain equipment and storage bins; screw conveyor; copper tubular condenser; steel tanks, etc. Write for list —or contact Mr. Zarow at Peoria. 2-4524.

FOR SALE FROM STOCK

8—3000 gal. Horiz. Demountable Stainless Steel Truck Tanks, insulated & agitated, sanitary fittings, excellent for transporting, storing or holding milk, food products, wines, etc.

1—2000 gal. Horiz. Stainless Steel Truck Tank, insulated.

1—Illinois Water Treating System, 500 GPH low-rate, complete with Zeolite tank.

2—Lee Stainless Steel Jacketed Kettles, with double motion agitators. 250 gal., 125# jkt.

70—Stainless Steel and Stainless Clad Jacketed Kettles. 10, 40, 60, 80, 100, 150, 500 gal.

35—Stainless Steel Tanks, 30, 50, 60, 100, 150, 300, 400, 500, 900, 1000, 1400, 3000, 3500 and 5700 gal.

1—100-gal. T347 Stainless Steel Pressure Tank, 250# Pr., Elec. heated.

5—Aluminum Tanks, closed, 500, 1100, 1350, 1485 gal.

18—Horizontal Glass Lined Steel Tanks, 7500 & 8250 gal.

1—Manton Gaulin 125 CGD Homogenizer, stainless steel—unused.

6—Powder Mixers, 50#, 100#, 200#, 400#, 2000#, 2400#.

4—Selectro Stainless Steel Vibrating Screens, two-deck, 2' x 7', enclosed.

10—Rotary Pellet Presses, Stokes B-2, D-3 & D-4; Kux model 25.

2—Triangle G-2-C Elec-Tri-Pak Weighers & Fillers.

2—Elgin Auto. Twin Piston Fillers.

2—Mojonnier #90 Rotary Vacuum Fillers, 14-spout; stainless.

1—Feinc Rotary Vacuum Filler, string discharge, 4'6" dia. x 6', aluminum.

2—Sweetland Filters, #2 & #5.

10—Distillation Columns, aluminum, copper, steel.

PERRY EQUIPMENT CORP.
1411 N. 6th ST. PHILA. 22, PA.

One Model 18-D-12 Sparkler Horizontal Plate Filter

Complete with 14 plates of Silicon Bronze, Viking H117 Bronze Pump, 220 Volt Motor. Price, $800; f.o.b. Selma. Address inquiries to

AMERICAN CANDY MFG. CO.
Selma, Alabama

FOR SALE

3—2000 GALLON CHERRY BURRELL

Stainless Steel lined horizontal, cylindrical storage tanks with agitators and 3" cork insulation.

HERSHEY CREAMERY COMPANY
Box 121, Harrisburg, Penna.

Quick ANSWERS to your business problems . . .

HUNDREDS of business problems can be quickly and easily solved through the use of the Searchlight Section of this or other McGraw-Hill publications.

The Searchlight Section is classified advertising; you can use it at small cost, to announce all kinds of business wants of interest to other men in the fields served by these publications. It is the accepted meeting place of men with business needs and the men who can fill those needs.

When you want additional employees or a position, want to buy or sell used or surplus equipment, want products to manufacture, seek new capital or have other business wants—advertise them in the Searchlight Section for quick, profitable results!

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McGRAW-HILL PUBLISHING CO., Inc.

330 West 42nd Street

NEW YORK 36, N. Y.

EXCELLENT REBUILT & GUARANTEED MACHINERY

At A Fraction Of The Original Cost

International Stainless Steel Straightline Vacuum Filler, with Automatic Feeder, 160 per minute.
Resina S and LC Automatic Cappers.
Chisholm Ryder New Way Model MH Wraparound Labeler.

UNION Rebuilt Machinery
Established 1912

Consolidated 13" Macaroni Presses for long goods.
Battery of Grimolas, and Macaroni Dough Mixers.
Clermont Noodle Rolling and Cutting Machine.
Clermont Reversible Dough Brake.
Baker Perkins BB, JNM and Readco Heavy Duty 50 to 150 gal. Double Arm Jacketed Mixers, Sigma or Fish Tail Blades.
Day and Robinson 100, 2400, 4000 lbs. Dry Powder Mixers and Sifters.
J. H. Day 35 and 75 gal. Imperial Double Arm Steam Jacketed Mixers.
Day, Ross Pony Mixers; 8 and 15 gal. caps.
B-P type 3500 gal. S. J. Double Arm Mixer.
Stokes, Day, New Era, Hottman Mixers, 2 to 450 gals. with and without Jackets, Single and Double Arm Agitators.
Baker Perkins 200 gal. Unidor Steam Jacketed Double Arm Mixer.
Mikro 4TH, 3TH, 2TH, 1SH Pulverizers; Jay Bee, Schutz O'Neill, Stedman Mills.
Allis Chalmers, Great Western Sifters.
Colton Rotary Tablet Machines.
Pony M, ML, MX Labelrites; Ermold, World Semi and Fully Auto. Rotary, Straightaway Labelers.
Burt Automatic Wraparound Labeler.
S. & S. G1 and G2 Auger Fillers.
F. J. Stokes HG88 Duplex Auger Filler.
Whiz Packer B1, B2 Fillers.
Triangle Package Models G2C, G2S, N2CA Elec-Tri-Pak Fillers.
Triangle SHA Filler and Carton Sealer.
Horix and Elgin S. S. Rotary Filler.
Filler 1, 2, 4, 8 head S. S. Auto. Piston Fillers, Rising Bed Feature.
Ayars Rotary Filler #10 Cans, etc.
Stokes 90D Auto. Tube Filler and Closer.
Stokes, Colton Tube Filler and Closer.
Amsco, Doughboy and Heat Seal-It 15D "Pacer" Auto. Cellophane Bag Sealers.
Standard-Knapp No. 429 Carton Sealer.
Hayssen 3-7, Package Machy. Co. FA, DF, CA2; Miller & Scandia SFC and SSU1 Auto. Cello. Wrappers.
Sweetland, Vallez, Sperry, Shriver, Republic, Alsop and Ertel Filter Presses.
Huhn Steam & Gas-fired Rotary Dryers.
Pneumatic Scale Auto. Tite-Wrapper.

IMMEDIATE DELIVERIES — **Write-Wire-Phone Collect For Full Details And Prices**

Union STANDARD EQUIPMENT CO.
318-322 LAFAYETTE ST., NEW YORK 12, N.Y.

TOP PRICES PAID FOR YOUR SURPLUS EQUIPMENT

FOR SALE

Tanks: Stainless Steel—5 to 350 gal.
Dryer: 36x80" double roll atmospheric.
Powder Mixers: 100 to 2000 lb. capacities.
Liquid Fillers: Vacuum and Siphon types.
Screens: Rotex 40x90", Link Belt 24x96" liquid.
Colloid Mill: Charlotte M-15, stain. steel.
Kettles: Stain. Steel, all sizes, new and used.
Filter Press: 24" Shriver 25 chambers.
Powder Fillers: Stokes & Smith, Stokes, Triangle.
Roller Mill: National 5-roll 16 x 40".
Boilers: Gas fired: 6, 7½, 10, 30 hp.
Fillers: Geyer, Kiefer, Visco, M&S., Elgin.
Dicer: Sterling with 1 hp. motor.
Labelers: New Jersey, World, Knapp, Burt, Ermold.
Dough Mixers: Day, Read, Hobart, Champion.
Cappers: Capem, Pneu. Scale, Elgin, U. S.
Vacuum Pans: 6' stain. steel, 5' copper.

Send us a list of your idle equipment

LOEB EQUIPMENT SUPPLY CO.
1931 W. North Ave. Chicago 22, Ill.

Charles S. **JACOBOWITZ Co.**
3083 MAIN STREET - BUFFALO 14, N.Y. - AMHERST 2100

38 ONE-PIECE GLASS-LINED TANKS

HORIZONTAL WELDED STEEL CONSTRUCTION WITH DISHED HEADS!

The following tanks in first-class condition still erected in brewery in New York City, available for immediate delivery and priced attractively. Linings practically perfect. Offer is subject to prior sale.

29—7290-gal. (approx.) tanks, 8'6" O.D., length of shell 15'6", 2-12" dished heads, 17'6" total overall length.
5—7110-gal. (approx.) tanks, 8'6" O.D., length of shell 15'1", 2-12" dished heads, 17'1" total overall length.
1—5850-gal. (approx.) tank, 8' O.D., length of shell 14'8", 2-12" dished heads, 16'8" total overall length.
3—5100-gal. (approx.) tanks, (vertical) 8'6" O.D., length of shell 12'9", 2-12" dished heads, 15'9" high.

Serving American Industry for over 30 Years

VALUES *"BUY BRILL"*

2—Bowen and Rogers 16' dia. Spray Dryers.
2—8000 gal. Stainless Steel lined Vertical Tanks.
1—350 gal. S.S. Jacketed Agitated Kettle.
2—Oliver 8'x10' Monel Rotary Vacuum Filters.
1—Feinc 8'x12' Steel Rotary Vacuum Filter.
9—Oliver Rotary Vacuum Filters 3'x4', 8'x8', 8'x12', 11'6"x14'.
1—Vallez #9 Filter, 41 S.S. covered leaves.
1—Allbright-Nell 60"x80" Flaker.
2—Buffovak 32"x100" Atmospheric Double Drum Dryers.
1—Link Belt Roto-Louvre Dryer 11'6"x35'.
1—Link Belt Roto-Louvre Dryer 2'7"x8', monel.
1—Tolhurst 32" Suspended Centrifugal, monel perforated basket, bottom discharge, m.d.
1—Fletcher 40" Suspended Centrifugal, stainless perforated basket, bottom discharge, m.d.
2—Tolhurst 48" Center Slung Stainless Steel Centrifugals.
2—#7 Sweetland Filters, 27 leaves, 3" c.c.
4—Shriver 30", 24", 18", 12" P&F Filters.
2—Sperry 30", 24" Aluminum P&F Filter Presses.
3—Louisville 6'x50', 6'x30' Steam Tube Dryers.
3—Steel Jacketed, Pressure Kettles, 2000, 1000 gal.
1—Bethlehem 1400 gal. Steel Jacketed Still.
6—Sprout Waldron 40"x84" Single Deck S.S. Gyratory Sifters.
25—Stainless Kettles and Tanks, 20 to 500 gals.
12—Day, Rodgers Powder Mixers, 200 to 3000 lbs.

Send for Complete Stock List

BRILL EQUIPMENT COMPANY
2401 Third Ave., N. Y. 51, N. Y.
Telephone: CYpress 2-5703

FOR SALE

100 qt. 6 speed Read Vertical Mixer
80 qt. 4 speed Hobart Vertical Mixer
No. 76 Enterprise Food Grinder, belt drive
Burns Peanut Roasters and Blanchers
No. 6 Royal Roaster, 75 lb. capacity
125, 200 and 250 lb. Nut Fryers
250 gallon Copper Steam Jacketed Kettle

SAVAGE BROS. CO.
2633 Gladys Ave. Chicago 12, Ill.

FOR SALE—MODERN PACKAGING EQUIPMENT

LATE MODEL

PNEUMATIC SCALE CO. 35 Per Minute.
AUTOMATIC CARTONING LINE
Automatic Feeder, Bottom Sealer, Liner, Filler, Top Sealer & Compression Unit.

PNEUMATIC High Speed Feeder & Bottom Sealer
PNEUMATIC SCALE CO. Medium size, Double Package Makers.
PNEUMATIC 20 spout automatic Vacuum Filler
PNEUMATIC SCALE CO. Tightwraps
PNEUMATIC SCALE CO. Inner Liners, large & small sizes.
PNEUMATIC 4 scale Net Weight Filler
PNEUMATIC Automatic 4 Head Capper
PNEUMATIC Single Head Automatic Capper
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ADVERTISERS IN THIS ISSUE

Allis-Chalmers Mfg. Co. ... 4
Aluminum Cooking Utensil Co., The ... 67
American Can Co. ... 66
American Gas Association ... 52
Amerio Contact Plate Freezers Inc. ... T205
Anderson Co., V. D., The ... 57
Armstrong Cork Co. ... 161
Automatic Sprinkler Corp. of America 157

Babcock & Wilcox Tube Co., The ... 48
Bakelite Co., a Div. of Union Carbide & Carbon Corp. ... 19
Beckman Instruments, Inc. ... 12
Bemis Bro. Bag Co. ... 55
Bowman & Co., Charles ... 55

Cambridge Wire Cloth Co., The ... 182
Canning Machinery Divisions ... 130
Carpenter Steel Co., The ... 41
Centrico Inc. ... TL216
Century Electric Co. ... 53
Cherry-Burrell Corp. ... 68
Chester-Jensen Co. ... L204
Chrysler Corp. (Dodge Div.) ... 179
Container Corp. of America ... 30
Corn Products Refining Co. ... 22
Crane Co. ... 139
Cyclone Fence Div., U. S. Steel Corp. TR193

Darnell Corp. Ltd., The ... 168
Day Co., The ... 178
De Laval Separator Co., The ... 10
Detecto Scales Inc. ... TL194
Distillation Products, Ind. ... 43
Dodge Mfg. Corp. ... 34
Dodge & Olcott, Inc. ... 189
Dow Chemical Co., The ... 170
Dow Corning Corp. ... L206
Downington Iron Works ... 190
Dudley Machinery Co. ... 176

Eaton Mfg. Co. ... 35
Electric Auto-Lite Co. ... TR165
Electric Storage Battery Co., The ... 59
Exact Weight Scale Co., The ... 192

Ferguson Co., H. K., The ... 153
Food Machinery & Chem. Corp. ... 130
Frick Co. ... BR195
Fritzsche Bros., Inc. ... 172
Fruehauf Trailer Co. ... 28
Fuller Co. ... 29
Fuller Brush Co., The ... 169
Fulton Sylphon Div., Robertshaw-Fulton Controls Co. ... 58

Gair Co., Inc., Robert ... 14-15
Gaylord Container Corp. ... Third Cover
General Amer. Trans. Corp. ... 8, 174
General Electric Co. ... 42, 65
Globe Heat-Seal, Inc., Heat-Seal-it Div. ... BR215
Griffith Laboratories, Inc., The ... 152
Grinnell Co., Inc. ... Second Cover

Hamilton Copper & Brass Wks., Div. of the Brighton Copper Wks., Inc. TR215
Heat Seal-it Div. Globe Heat-Seal, Inc. ... BR215
Hercules Filter Corp. ... L200
Hoffmann-LaRoche, Inc. ... 166
Holcomb Mfg. Co., J. L. ... 188
Hormann & Co., Inc., F. R. ... BR209
Howell Electric Motors Co. ... 148
Hudson-Sharp Machine Co. ... B205
Hunter Mfg. Co. ... TR216
Huron Milling Co. ... L158
Hyster Co. ... 154

Ingredients for the Food Processor (Not included in Reader Serv.) ... 217
International Harvester Co. ... 51
International Salt Co. ... 191
Island Equipment Corp. ... BR201

Jamison Cold Storage Door Co. ... 120
Jeffrey Mfg. Co. ... 144
Jenkins Bros. ... 37
Johns-Manville ... 124
Jones & Laughlin Steel Corp. ... 203

Koven & Bro., Inc., L. O. ... 62
Kraftile Co. ... 159

La Porte Mat & Mfg. Co. ... TR195
Lehigh-Horseheads Warehouse Corp. 164
Lee Metal Products, Inc. ... L198
Link-Belt Co. ... 6, 25, 45

Manheim Mfg. & Belting Co. ... 16
Master Electric Co., The ... 33
Mears-Kane-Ofeldt, Inc. ... TL195
Merck & Co., Inc. ... 32
Milo Radio & Electronics Corp. ... 180
Minneapolis-Honeywell Reg. Co., Industrial Div. ... 31
Mixing Equipment Co., Inc. ... 133
Monarch Mfg. Works, Inc. ... R198
Monroe Company, Inc., The ... 217
Mosaic Tile Co., The ... 140
Muirson Label Co. ... 173
Multi-Metal Wire Cloth Co. ... BR213
Mundet Cork Corp. ... BR197

Nash Engineering Co. ... 224
Niagara Blower Co. ... 24
Nicholson Co., W. H. ... BR187
Norda Essential Oil & Chemical Co. ... 138
Nutritional Research Associates ... 217

Oakite Products, Inc. ... 163
Ohio Injector Co., The ... 146

Package Machinery Co. ... 155
Paterson Parchment Paper Co. ... 118
Patterson Foundry & Machine Co., The 186
Pfaudler Co., The ... 49
Pfizer, Charles & Co., Inc. ... 122
Philadelphia Gear Works, Inc. ... 21
Pittsburgh Corning Corp. ... 171
Pneumatic Scale Corp., Ltd. ... 44
Powers Regulator Co., The ... L202
Professional Services ... 217

Quaker City Cold Storage Co., Inc. ... 217

Refined Syrups & Sugars, Inc. ... 40
Republic Steel Corp.
Alloy Steel Div. ... 60
Riegel Paper Corp. ... 214
Ryerson & Son, Inc., J. T. ... TR187

Sandvik Steel, Inc. ... 210
Sarco Co., Inc. ... TR213
Schutz O'Neill Co. ... BR200
Shepard Niles Crane & Hoist Corp. ... 175
Sparkler Mfg. Co. ... BR165

SALES REPRESENTATIVES

ATLANTA 2 ... Ralph Maultsby
1311 Rhodes-Haverty Bldg., Walnut 5778
BOSTON 16 ... J. F. Jurascheck
1427 Statler Bldg. ... Hubbard 2-4911
CHICAGO 11 ... D. T. Kenney
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DALLAS 1 ... J. H. Cash
First National Bank Bldg. ... Prospect 7-5064
LOS ANGELES 17 ... J. H. Allen
1111 Wilshire Blvd. ... Madison 6-4323
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330 West 42nd St. ... C. C. Randolph
Longacre 4-3000
PHILADELPHIA 3 ... Edward A. Martin
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PITTSBURGH 22 ... Thomas E. Taylor
7389 Oliver Bldg. ... Atlantic 1-4707
SAN FRANCISCO 4 ... J. W. Otterson
68 Post St. ... Douglas 22-4600
ST. LOUIS 8 ... D. T. Kenney
Continental Bldg. ... Lucas 4867
LONDON, ENGLAND ... Bernard Butler
W. C. 2, Aldwych House, Aldwych

Sprout, Waldron & Co. Inc. ... 181
Staley Mfg. Co., A. E. ... 17, R211
Standard Brands Inc. ... TR200
Standard Conveyor Co. ... TR197
Standard-Knapp, Div. of Emhart Mfg. Co. ... 26-27
Standard Oil Co. (Indiana) ... 39
Standard Steel Corp. ... 126
Stephens-Adamson Mfg. Co. ... 184
Sterling Electric Motors ... 61
Sterwin Chemicals Inc. ... 64
Sutton, Steele & Steele, Inc. ... 162
Sylvania Div., American Viscose Corp. 223
Syntron Co. ... BL194

Taylor Instruments Cos. ... 47
Texas Co., The ... 4th Cover
Thermoid Co. ... 50
Trailmobile Inc. ... 212
Transparent Wrap Machine Corp. ... 183
Trent Tube Co. ... 54
Tri-Clover Machine Co. ... 46

Union Bag & Paper Corp. ... 150
Union Carbide and Carbon Corp. Bakelite Co. ... 19
U. S. Electrical Motors, Inc. ... 207-208
U. S. Steel Corp. ... TR193

Van Ameringen-Haebler, Inc. ... 63
Vilter Mfg. Co., The ... R158

Wallace & Tiernan Co., Inc. ... 177
Walworth Co. ... 18
Wheeler Mfg. Co., C. H. ... 36
Where to Buy ... 217
Where to Store Frozen Foods ... 217
Worthington Pump & Machinery Corp.
Air Conditioning & Refrigeration ... 38
Centrifugal Pump Div. ... 20
Industrial Mixers Div. ... 151
Wright Machinery Co. ... 128
Wyandotte Chemicals Corp. ... 199

Yale & Towne Mfg. Co., The ... 23
Yarnall-Waring Co. ... BR193, BL196
York Corp. ... 156

PROFESSIONAL SERVICES ... 217

SEARCHLIGHT SECTION
(Classified Advertising)

EMPLOYMENT
Positions Vacant ... 218
Selling Opportunities Offered ... 218
Positions Wanted ... 218
Selling Opportunities Wanted ... 218
Employment Services ... 218
SPECIAL SERVICES
Contract Work ... 218
EDUCATIONAL
Schools ... 218
BUSINESS OPPORTUNITIES
Offered ... 218, 219
PROPERTY
For Sale ... 218
Wanted ... 219
EQUIPMENT
(Used or Surplus New)
For Sale ... 219-221
WANTED
Equipment ... 221

ADVERTISERS INDEX

Allied Equipment Co. ... 221
American Candy Manufacturing Co. ... 220
Brill Equipment Co. ... 221
Consolidated Products Co., Inc. ... 220
Drake Personnel, inc. ... 218
Equipment Clearing House, Inc. ... 219
First Machinery Corp. ... 219
Gale, C. J. ... 219
Gelb & Sons, Inc., R. ... 219
Hershey Creamery Co. ... 220
Jacobowitz Co., Chas. S. ... 221
Kehoe Machinery Corp., Lester ... 219
Loeb Equipment Supply Co. ... 221
Miami School for Processing Specialties ... 218
Perry Equipment Corp. ... 220
Qualified Employment Agency ... 218
Savage Brothers Co. ... 221
Union Standard Equipment Co. ... 221

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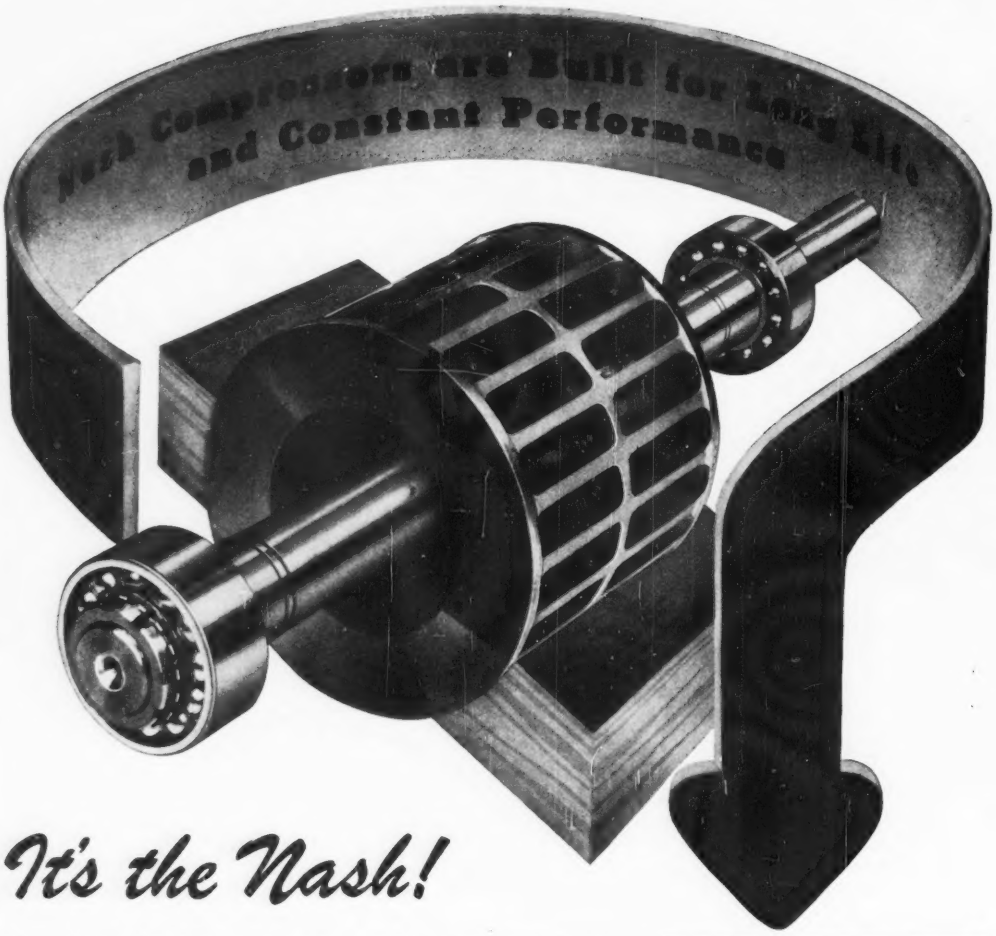

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EDITORIAL ITEMS . . .

BOTTLERS' SHOW

Page 86
Carry-home case 86A
Carry-home carton 86B
Hand truck 86C
Pallet-truck body 86D
Lubricator (conveyor).....86E

Page 87
Case packer 87A
Honeycomb filter 87B
Water treater 87C
Automatic uncaser 87D
Case unloader 87E
Manual uncaser 87F
Semi-automatic uncaser....87G
Washer-loader 87H

NEW EQUIPMENT, SUPPLIES

Page 115
Control system 115A
Telescopic loader 115B

Page 116
Food lug cleaner.....116A
Tractor-trailer device.....116B

Page 117
Pea combine 117A
Conveyor sections 117B

Page 119
Carton imprinter 119A
Pilot-plant pulverizer 119B

Page 121
Rubber frame goggles.....121A
Truck refrigerator 121B
Case sealer 121C
Roller-curve conveyor.....121D

Page 123
Lift truck 123A
Hand truck 123B
Scrubber-dryer 123C

Page 125
"Flight" heat exchanger...125A
Yeast-mix cabinet 125B

Page 127
Compact battery-charger..127A
Capacitor motors 127B
Bin-level indicator 127C

Page 129
Retractable stacker 129A
Two-way liquid valve.....129B
Rubber door 129C

Page 131
Liquid germicide 131A
Chlorine system 131B
Non-melting grease 131C
Floor life extender.....131D

NEW PACKAGES

Page 160
Carton (ice cream).....160A
Tumbler (nuts) 160B
Closures (nuts) 160C
Labels (nuts) 160D
Carton (nuts) 160E
Boxes (assorted foods)....160F
Label design (meat).....160G
Cans (meat) 160H

Page 162
Carton design (mints)....162A
Carton design (cranberries) 162B

Page 163
Jars (pimientos) 163A
Closures (pimientos) 163B

Page 164
Foil Wrap (jelly mix)....164A
Boxes (jelly mix) 164B
Labels (jelly mix) 164C
Cartons (jelly mix).....164D
Package design (frozen foods) 164E

NEW TECHNICAL LITERATURE

Food Plant Equipment

Page 211
Can washer 211A
Mills & Mixers.....211B
Brewing instruments 211C
Meat packers' instruments.211D
Electro-mechanical selector 211E
Bulk sterilizer 211F
Proportioning equipment..211G

Control Equipment

Page 211
Linear transducers 211H
Electronic tubes 211I
Check valve (water).....211J
Water columns and gages..211K
Potentiometers 211L

Page 213
Load cells 213A
Blow-off valves 213B
Colorimeters 213C

Materials Handling

Page 213
Tractor-shovel 213D
Hand trucks 213E
Conveyors 213F
Fork trucks 213G
Electric trucks 213H
Chain drive 213I

Plant Supplies

Page 213
Plastic mold steel.....213J
Receiver-type purifier 213K
Steam cleaner 213L
Boilers (oil, gas).....213M
Asbestos fabric packing...213N
Vacuum attachment 213O

Page 215
Alloy rods 215A
Vacuum machines 215B
Vaporizers 215C
Plastic products 215D
Unit heater trap.....215E
Drum cleaner 215F
Enclosed motor 215G
Spectrophotometer 215H
Rodenticide 215I

Miscellaneous

Page 215
Daylight blacklight.....215J
Pallet box handling.....215K
Aluminum-bronze alloy 215L

For products advertised turn page

YOUR READER SERVICE CARD

Circle the numbers of the items — editorial or advertising — that interest you. Consult listings above and on following page for the correct number.

FOOD ENGINEERING DECEMBER, 1951

EDITORIAL ITEMS

86A	87D	116B	121D	127C	160A	162A	164E	211H	213D	213L	215E	
86B	87E	117A	123A	129A	160B	162B	211A	211I	213E	213M	215F	
86C	87F	117B	123B	129B	160C	163A	211B	211J	213F	213N	215G	
86D	87G	119A	123C	129C	160D	163B	211C	211K	213G	213O	215H	
86E	87H	119B	125A	131A	160E	164A	211D	211L	213H	215A	215I	
87A	115A	121A	125B	131B	160F	164B	211E	213A	213I	215B	215J	
87B	115B	121B	127A	131C	160G	164C	211F	213B	213J	215C	215K	
87C	116A	121C	127B	131D	160H	164D	211G	213C	213K	215D	215L	

ADVERTISEMENTS

2	20	32a	40	52	63	65e	133	R155	166a	177	189	TL196	L202	212
4	21a	32b	41	53	64a	65f	138	156	166b	178	190	BR197	203	BR213
6	21b	32c	42	54	64b	66	139	R157	166c	179	191	TR197	L204	TR213
8	21c	32d	43	55	64c	67	140	L158	168	180	192	L198	B205	214
10	22	32e	44	56	64d	68	144	R158	169	181	BR193	R198	T205	BR215
12	23	33	45	57	64e	118	146	R159	170	182	TR193	199	L206	TR215
14–15a	24	34	46	58	64f	120	148	161	171	183	BL194a	BR200	207–208a	TL216
14–15b	25	35	47	59	64g	122	150	L162	172	184	BL194b	L200	207–208b	TR216a
16	26–27	36	48	60a	65a	124	R151	163	173	186	TL194	TR200a	BR209	TR216b
17	28	37	49	60b	65b	126	152	164	174	BR187	BR195	TR200b	210	223
18	29	38	50	61	65c	128	R153	BR165	175	TR187	TR195	BR201	R211	226
19	31	39	51	62	65d	130	154	TR165	176	188	BL196			

REQUEST, OR COMMENT.....

Name..... Position..... Company.....

Address.....Card expires March 10, 1952

PRODUCTS ADVERTISED . . .

Air conditioning & refrigeration equipment 156, R158
Axles, truck, two-speed.....35
Batteries, iron-clad 59

Belts
- Conveyor
  - Cat # 3679.....50
  - Metal TR193
  - Steel, flexible TR195
  - Woven wire 182
- V 16

Boilers, steam TL196
Brine, self-filtered 191
Builders, engineers R153

Bulk materials handling equipment 184
Can drying machines.....130
Casters; wheels 168

Centrifuges
- Clarifiers, purifiers, separators TL216
- Clarifiers, separators 10

Chains, roller, steel.....25
Chains; sprockets 6

Chemicals
- Citric acid, anhydrous....122
- Defoamers L206
- Flour bleaching & maturing agents 64f
- Leavening agent-blend soda 199
- Yeast extracts 55

Cleaning compounds & equipment
- Booklet F 7709.....163
- Brushes, semi-spiral 169
- General line 188
- Sanitizing agents 64e

Conveying systems, dry materials 29

Conveyors
- Belt, steel 210
- Gravity, power T197
- Sanitary BR201
- Screw 45

Dryers
- Bulletin 126
- Granular materials 144
- Rotary 8

Dust control 178
Electronic equipment 180
Enrichment concentrates ...64b
Evaporators, vacuum 49
Fabricated units BR213
Fabricators 62
Filter aids 124

Filters
- Pressure
  - Leaf L200
  - Sanitary BR209
- Stainless BR165

Fittings, tubing, sanitary....46

Flavors
- Cocoanut 63
- General line 138, 172

Improvers
- Corn syrup 22, R211
- Monosodium glutamate 17, L158
- Sugar, liquid 40
- Seasonings, soluble 152
- Spisoresins 189
- Vanillin 64c

Food colors 64d
Gas, food processing.....52
Gears, industrial 21a
Grinding equipment 181

Grinding equipment-Pulverizers BR200

Heat exchangers 190

Heat transfer medium-dowtherm 170

Heaters, gasoline TR216a
Hoists, electric 175
In-plant chlorination 177

Insulations
- Cork BR197
- Glass 171

Lubricants oil 39, 226

Materials of construction-Stainless TR187

Measurement & control instruments
- Air vents, thermostatic, cat 276 .....TR213
- Bulbs, resistance 65b
- Control systems-temperature, pressure 31
- Humidity, pressure, temperature 47
- Indicators, temperature ..65d
- Meters, pH 12
- Potentiometers 65f
- Pyrometers 65c
- Recorders, indicators, temperature TR165
- Regulators-valves L202
- Thermocouples, accessories 65e
- Thermometer, resistance..65a

Mixers, hot-cold water.....58

Mixing equipment
- Mixers
  - Cat #505 186
  - Pan-type, cat #R-708..R151
  - Portable 133

Motors
- Cat. #B-60 61
- Explosion-proof 207-208b
- Gear 33
- General line 148
- Squirrel cage 53
- Totally-enclosed 207-208a
- Totally enclosed, fan cooled 4

Nozzles, spray BR193, R198

Packaging machines
- Bags 60a
- Can unscramblers 176
- Carton feeding, sealing.....44
- Feed unit, liquid.....183
- General line 26-27
- Heat-sealing BR215
- Set-up, automatic R155
- Weigh-filling 128
- Wrappers B205

Packaging materials
- Cellophane 223
- Containers
  - Bags 60b
  - Cartons, folding 14-15b
  - Corrugated 150
  - Corrugated, shipping 14-15a
  - Drums, pails, steel.....203
  - General line 66
  - Glass 161
- Labels 173
- Papers 214
- Parchment, vegetable 118
- Resin coatings 19

Processing equipment
- Kettles
  - Agitators included L198
  - Aluminum, sanitary 67
  - Stainless 56
- Mix-cooker TR215
- Vacuumizer L204
- Vat-steam heating expansion cooling, literature...68

Pumps—Centrifugal 20
Purifiers, cat #200; #500...57
Reducers, speed 21b, 34

Refrigeration equipment
- Compressors, ammonia 38, BR195
- Coolers
  - Cargo TR216b
  - Low temperature, freezing, storage 24
- Doors, cold storage.....120
- Freezers, contact plate..T205
- Vacuum 36

Scales 192, TL194
Separators; stoners.....L162

Speed drives, adjustable, cat 5334 42

Sprinklers R157
Strainers BL196
Tank cars 174
Tile, floors, walls.....140
Traps, steam 139, BR187

Trucks
- Commercial ...28, 51, 179, 212

Industrial
- Lift 23
- Lift, straddle, turret....154

Tubing, stainless 54
- Cat TDC-140 48
- Free slide chart 41

Valve controls—Torque.....21c

Valves—General service 2, 18, 37, 146

Vibratory equipment
- Feeders BL194b
- Vibrators, electric ...BL194a

Vitamins
- A, natural, synthetic.....43
- B-complex products...TR200b
- B_1
  - Thiamine 166a
  - Thiamine Hydrochloride 32a
  - Thiamine Mononitrate..32b
- B_2, riboflavin 32c, 166b
- C, ascorbic acid 32e
- D, products TR200a
- Feed formulas 64g
- General line 64a
- Niacin 32d, 166c

Wall units, industrial.....R159
Warehousing service.....164

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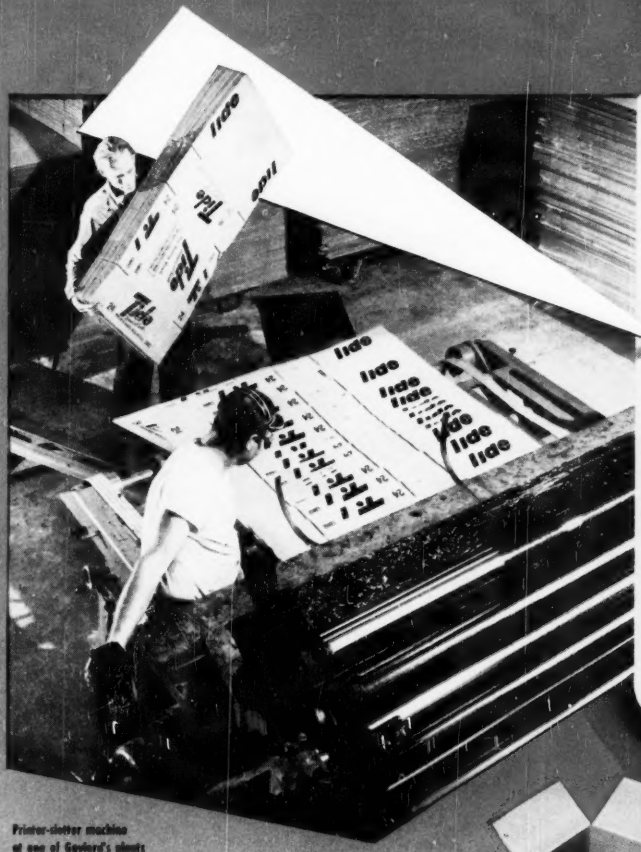
DECEMBER, 1951



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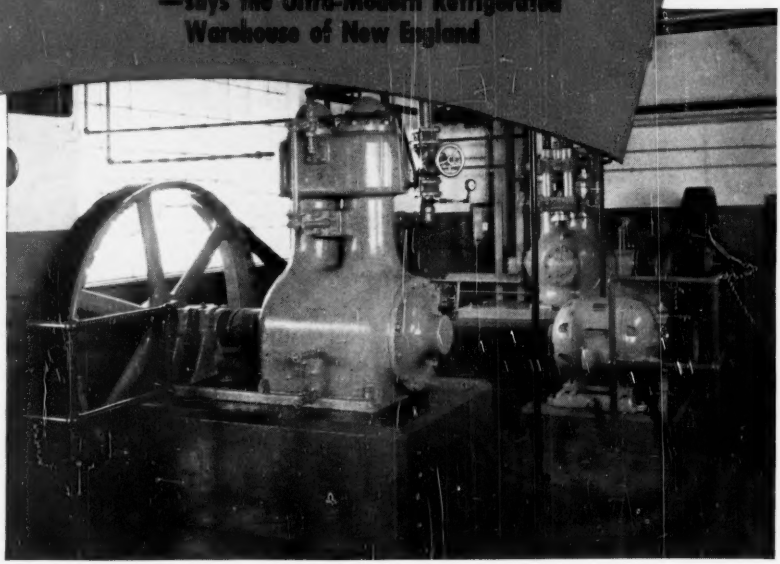
—says the Ultra-Modern Refrigerated Warehouse of New England



Both York and Baker compressors are used in the Pioneer Valley Refrigerated Warehouse, Springfield, Massachusetts. Notable efficiency and economy in operation are assured by the use of *Texaco Capella Oils* exclusively.

PIONEER Valley Refrigerated Warehouse, Springfield, Massachusetts, operates the largest facilities in that section of New England for the storage and distribution of nationally famous frozen foods. They say:

"Since we started lubricating our refrigerating compressors with *Texaco Capella Oil* some years ago, we have had ideal results. We are getting maximum refrigeration with minimum operating and maintenance expense, and are particularly impressed by the way *Texaco Capella Oil* keeps both compressors and systems clean."

Now — the new and improved *Texaco Capella Oil (Waxfree)* is available to assure high efficiency and clean compressor operation *even at minus 100° F.* Tests prove it has lower haze and floc temperatures than any other oil — with resulting freedom from wax precipitation. *Texaco Capella Oil (Waxfree)* also has extreme purity, low pour test, high oxidation resistance and freedom from moisture. Will not react with refrigerants. Available in every needed viscosity.

Let a Texaco Lubrication Engineer help you get greater efficiency and economy from *your* compressors. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Capella Oils (Waxfree)

FOR ALL AIR CONDITIONING AND REFRIGERATING EQUIPMENT

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